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CONTENTS.

No. I.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

No. II.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

No. III.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

No. IV.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

CONTENTS.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

MISCELLANY.

THE

AMERICAN JOURNAL

OF

PHARMACY.

APRIL, 1837.

ORIGINAL COMMUNICATIONS.

ART. I.—CRITICISMS AND SUGGESTIONS RESPECTING NOMENCLATURE. By Robert Hare, M. D., Professor of Chemistry in the University of Pennsylvania.

ALSO, A LETTER FROM THE CELEBRATED J. J. BERZELIUS.

[*To the Editors of the Journal of Pharmacy.*]

Philadelphia, *March 4th*, 1837.

Dear Sirs—In September, 1833, I published in your Journal, together with some encomiums upon the Treatise of Chemistry by the celebrated Berzelius, certain objections to his nomenclature, and some suggestions respecting a substitute, which I deemed to be preferable. In the following June I addressed a letter to Professor Silliman upon the same topics, in which my criticisms and suggestions were amplified and corrected in obedience to more mature reflection. A printed copy of that letter having been sent by me to Berzelius, I received in answer an epistle, of which I furnish you with a translation.

Since the period of that correspondence, so demonstrative of candor and good feeling on the part of the great Swedish chemist, I have published two editions of my Compendium of Chemistry, in which I have pursued a course corresponding with my criticisms above alluded to. I am therefore desirous, in addition to the letter of Berzelius to lay before the public a recapitulation, review, and an additional explanation of the grounds upon which I have ventured to employ a language,

and an arrangement inconsistent with the practice and opinions of a chemist by whose authority in other respects I am usually influenced. But before proceeding with the ungracious task of endeavouring to establish the correctness of my views in opposition to those of my friend, I feel that it will be no more than justice to repeat an acknowledgment, already made in my text book, that if De Bonsdorff, myself, and others are right in considering the *double* salts of Berzelius as *simple* salts, it is to the light afforded by his investigations, that we owe the power of seeing the subject correctly. I believe the idea, that any other body besides oxygen could produce both acids and bases capable of forming salts, originated with Berzelius, in the instance of sulphur.

Recapitulation and review of the grounds of his deviating from the language and arrangement of Berzelius, *and other distinguished chemists; with some additional explanations and suggestions, by* R. Hare, *M. D., Professor of Chemistry in the University of Pennsylvania.*

According to the Berzelian nomenclature, bodies which produce salts by a union with radicals are called *halogen* or *salt producing bodies,* while those which with radicals form both acids and bases, capable by their union of constituting salts, are called *amphigen bodies* or *both producers.* Salts, produced by the first mentioned class are called haloid salts; Those produced by the other are called amphide salts.

I objected to this classification, that the words *salt, acid* and *base,* were broad, vague and unsettled in their acceptation, having, by chemists in general, and especially by Berzelius, been employed to designate substances differing in composition, and extremely discordant in their properties; that no method of defining a salt had been devised, which had not been founded either on properties or composition; that in the nomenclature of Berzelius properties were disregarded, since among his haloid and amphide salts were found substances differing extremely in this respect. Thus, for instance, common salt, Glauber's salt, Epsom salt, vitriolated

tartar, and cream of tartar, were associated with the fuming liquor of Libavius, the butyraceous chlorides of zinc, antimony, and bismuth, plumbum corneum, luna cornea, fluor spar, and the acid fluorides of silicon and boron. I objected also that composition could not be resorted to consistently with his classification ; since, agreeably to it, a salt might be either a binary compound of a halogen body with a radical, or consist of two binary compounds, each containing the same amphigen body.

To the terms *acid* and *base*, as employed in his nomenclature, I objected, that neither by the celebrated author, nor by any other chemist had any definition been adhered to which could, consistently with his plan, restrict the meaning of those appellations to the binary compounds formed by the union of his amphigen bodies with radicals.

Acidity and basidity* had sometimes been distinguished by an appeal to properties, sometimes to composition, but to neither had there been any consistent attention. In order to demonstrate the total neglect of properties latterly displayed, it was only necessary to contrast substances bearing generally the name of acids; as for instance sulphuric acid with rock crystal, acetic acid with tannin, and prussic acid with margaric ; or to contemplate simultaneously the admission of the hydracids formed with the halogen bodies into the class of acids, while alleged incapable of combining with bases, with the exclusion from that class of nitrous acid, upon the plea of the same incapacity.

In reference to neglect of composition in forming the class of acids, it will be sufficient to advert to the association in that class, of compounds formed with radicals both by the halogen and amphigen bodies ; so that the halogen bodies are in one case producers of salts, in the other producers of acids; in one case act as supporters, acidifiers, or electro-negative principles, in another as radicals to the comparatively electro-

* For the use of the words basidity and salidity, I have no authority; but conceive that through their analogy with acidity their meaning is so obvious as to make it expedient to employ them.

positive hydrogen, pre-eminently a radical by the definition of that word given in the treatise of the distinguished author of the nomenclature.

After stating my objections to the basis of the BERZELIAN nomenclature, I proceeded to mention those to which I considered the superstructure as liable.

Having designated the acid compounds of his amphigen class, by prefixing syllables indicating their electro-negative ingredients ; having also in some instances, as in those of the fluosilicic, and fluoboric acids, adopted this course in relation to halogen bodies; I objected to the use of the word hydracid, in which the electro-positive radical is made to act as if coordinate with oxygen.

Moreover, the termination in *ide* having been generally attached to the electro-positive compounds of oxygen, acting as bases, I condemned the employment of that termination, to distinguish the electro-negative, and acid compounds of sulphur, selenium, and tellurium. I considered it inconsistent to give precedence to the syllable designating the radical in the acids formed with hydrogen ; as in hydrochloric, hydrobromic, hydriodic, hydrofluoric, hydrofluoboric, hydrofluosilicic, preferring the terms chlorohydric, bromohydric, iodohydric, fluohydroboric, fluohydrosilicic, &c., in which I have been sanctioned by THENARD and others.

I proposed a definition of an acid, and a base, which I conceived to be the only one which could be adopted, consistently with the use made of those words by BERZELIUS, and other distinguished chemists; and advanced that, agreeable to that definition, his double haloid salts must be considered as *simple* salts, severally formed of an acid and a base.

I objected to his treating the words combustion, and oxygenation as synonymous.

Having thus made the reader acquainted with the substance of my criticisms upon the BERZELIAN nomenclature, I will subjoin his letter in answer to them, and will then state, and endeavour to justify, the conclusions at which I have arrived.

Letter from J. J. BERZELIUS *of Stockholm to* R. HARE, M. D., *Professor of Chemistry in the University of Pennsylvania, acknowledging the receipt of a communication respecting Nomenclature, and replying thereto.*

STOCKHOLM, *September 23d*, 1834.

Sir—I am very much obliged to you for the remarks, which, under the date of June 21st, you had the friendship to communicate to me, respecting the nomenclature which I have employed in my Treatise of Chemistry.

I perceive that having contemplated chemical phenomena under different points of view, we differ as to the nomenclature which is the most appropriate for their description. I consider the combinations of metals with chlorine, bromine, &c., as salts; whilst you, in accordance with Mr. DE BONDSDORFF, consider them as bases and acids, capable of forming salts by their union.

If it were expedient that chemical classification should be dependent on the number of simple bodies which enter into each combination, this idea of Mr. DE BONDSDORFF would without doubt be preferable; but if attention be due to the chemical properties which characterize combinations, we cannot adhere to an arrangement founded on the number of the elements. Yet so essential is it in chemistry to have reference to properties, that a system of chemistry in which common and analogous properties should not affect the arrangement, would present a mass of facts so chaotic, that no memory would be competent to retain them. In a system thus strictly conformable to the ideas of Mr. DE BONDSDORFF, cyanogen, though in its properties resembling chlorine or bromine which are simple bodies, ought to be considered, also, as a base or as an acid having azote for its radical—I am persuaded you would not approve of extending the system of DE BONDSDORFF so far; but if it be correct, it would be inconsistent not to make this extension.

But let us return to the combinations of the metals with chlorine, fluorine, &c., and make, in imagination, the follow-

ing experiment. Let us take two portions of caustic potash, a base in which the *basic* characters are more striking than in any other. To one, let us add a sufficiency of sulphuric acid to extinguish entirely its *basic* property; we shall then have a neutral body of a saline taste. You will admit it to be a salt. Now let us add to the other portion, hydrofluoric acid. At a certain point the *basic* properties of the potash will disappear, and we shall have a resulting compound quite as neutral as the sulphate of potash, endowed with a saline taste entirely analogous to that of the sulphate. The basic properties of the potash are destroyed by the hydrofluoric acid, as well as by the sulphuric acid. But you will allege the resulting combination is not a salt, but a base which has exchanged one basifier (oxygen) for another basifier (fluorine.) In proof you may add as much more hydrofluoric acid, which combining with the new base will form with it a crystallized salt. But this salt is not neutral, it has almost the same acidity of taste as the hydrofluoric acid employed. The new base does not destroy then the acid reaction.

Let us make a further addition of sulphuric acid to the sulphate of potash. A salt equally acid will result, in which the sulphate of potash acts the same basic part towards the sulphuric acid, as the fluoride of potassium towards the hydrofluoric acid. Should it be desired to extend the comparison further, it will be found that for each less electro-positive fluoride, susceptible of combination with the potassic fluoride, there will be, with but very few exceptions, a corresponding sulphate, susceptible of combination with the sulphate of potash. The analogy is then complete, it exists not only in the perfect neutrality of the two potassic salts, in their saline taste, but also in their manner of forming combinations with other bodies; notwithstanding one of them, the sulphate, contains one element more than the other. If, instead of potash, potassium were employed to saturate our two acids, the analogy of the operation in both cases, would be still more complete. The same quantity of metal, would displace equal volumes of hydrogen. When the visible results of our ex-

periments are so perfectly analogous, it is to be presumed that the invisible process which we do not see, may also be perfectly analogous, and that if facts exactly alike are explained differently, there must be a defect in the explanation. If, for instance, the true electro-chemical composition of the sulphate of potash should not be $KO+SO^3$, as is generally supposed, but $K+SO^4$,* and it appears very natural that atoms, so eminently electro-negative as sulphur and oxygen, should be associated, we have, in the salt in question, potassium combined with a compound body, which, like cyanogen in $K+C^2 N$,† imitates simple halogen bodies, and gives a salt with potassium and other metals. The hydrated oxacids, agreeably to this view, would be then hydracids of a compound halogen body, from which metals may displace hydrogen, as in the hydracids of simple halogen bodies. Thus we know that SO^3, that is to say, anhydrous sulphuric acid, is a body whose properties, as respects acidity, differ from those which we should expect in the active principle of hydrous sulphuric acid.

The difference between the oxisalts, and the halosalts is very easily illustrated by formulæ. In K|FF—fluoride of potassium, there is but one single line of substitution, that is to say, that of K|FF, whilst in KOOOOS (sulphate of potash) there are two, K|OOOOS and KO|OOOS of which we use the first in replacing one metal by another, for instance, copper by iron ; and the second in replacing one oxide by another.

I do not know what value you may attach to this deve-

* In the Berzelian symbols, K stands for kalium, or potassium, S for sulphur, O for oxygen, and O^3 for three atoms of oxygen, O^4 for four atoms of oxygen.

† That is to say, if the salt called sulphate of potash, be considered as compound of potassium, and a quadroxide of sulphur, instead of being viewed as a protoxide of potassium, or potash, and tritoxide of sulphur, or sulphuric acid.

This is the formula for cyanide of potassium, consisting of potassium, K, and cyanogen, or two atoms carbon and one of nitrogen, $C^2 N$.

lopement of the constitution of the oxysalts (which applies equally to the sulphosalts and others): but as to myself, I have a thorough conviction, that there is therein, something more than a vague speculation; since it unfolds to us an internal analogy in phenomena, which, agreeably to the perception of our senses, are externally analogous. If these phenomena are to be considered agreeably to the ideas of Mr. De Bondsdorff, how does it happen that sulphur, phosphorus, arsenic, and other radicals of the strongest oxacids, when united with chlorine, bromine, iodine, &c., do not combine with the chlorides,* bromides, &c., of the metals of the alkalies and of the earths; whilst the chloride and bromide of potassium combine easily with those of magnesium, iron, and manganese. Should then the chloride of magnesium, or that of manganese, be a stronger acid than the chloride of sulphur, or chloride of phosphorus? How is it consistent with these ideas that we can obtain crystallized salts as well with, as without water, of combination, composed of chloride of calcium and of oxalate, or of acetate of lime? Should the oxysalt be here the acid, or the base? I have now displayed to you, the considerations which have guided me, and which I think are not destitute of foundation.

I cheerfully admit that it would be preferable to employ the word chlorohydric, instead of hydrochloric. My motive for retaining this last, is, that I have ventured to propose a new nomenclature in a language foreign to me, in which it was inexpedient to make changes which could be avoided without inconvenience. I also agree with you, that we ought not to use combustible and oxidable, as having the same meaning. I have deserved your strictures for this inconsistency in my language; but I must suggest as an apology, that the two words were formerly used as synonymous, and that the work, in which you have recently noticed this oversight, was first published in 1806, having been from time to time

* I have translated chlorure, fluorure, bromure, by chloride, fluoride, and bromide, agreeably to the practice of the British chemists.

remoulded for new editions, without its having been possible to eradicate all that has not kept pace with the progress of science.

Accept the assurance of my perfect esteem, and of the sentiments of sincere friendship with which I have the honour to be, Yours, &c.

An Examination, by the Author of this Article, of the Suggestions in the preceding Letter of BERZELIUS, *and how far the Objections made to his Nomenclature, are therein answered.*

So far as my strictures were founded on the alleged difficulty of defining the terms acid, salt, and base, in any mode consistent with his classification, they are not met by any facts or reasoning in the much esteemed letter of my illustrious correspondent. The impracticability of defining a salt, he does not deny; and with great candour he admits that, in his definition of acidity, he has not been consistent. He concedes that it would be preferable to give the syllable, indicating the electro-negative ingredient, the precedence, as nothing but unwillingness to innovate, prevented him from pursuing that course.

He acknowledges that as combustion, in many instances, takes place without the presence of oxygen, the application of the word combustible, should not be confined to bodies which are susceptible of oxydizement.

My definition of acidity was as follows:—

" *When, of two substances capable of combining with each other so as to form a tertium quid,* and having an ingredient common to them both, one prefers the positive, the other the negative pole of the Voltaic series, we must deem the former an acid, and the latter a base. Also all substances having a sour taste, or which redden litmus,*

* This term *tertium quid* has been used by chemists, more formerly than of late, to designate a compound resulting from the union of two bodies, but in its properties resembling neither.

must be deemed acids, agreeably to usage." This definition I would now amend by leaving out the last sentence, and substituting therefor, the following: *Also when any substance is capable of forming a tertium quid with any acid or base agreeably to the preceding definition, it must be considered as an acid in the one case, a base in the other.* The definition, thus amended, takes in the organic acids and bases. In the form in which it was at first proposed, it has not been alleged defective by Berzelius; but he has striven to show an incongruity in the attributes of his double salts, when contrasted with those resulting from the union of some of the acids and bases of his amphigen class; which incongruity is, in his opinion, a sufficient reason for not considering them as *simple* salts, and their ingredients as acids and bases, agreeably to the opinions of De Bonsdorff and myself.

Berzelius errs in confounding my opinions with those of De Bonsdorff. However I may have admired the sagacity with which that chemist investigated the pretensions of some haloid salts to certain attributes of acidity or alkalinity; in my letter on the Berzelian nomenclature, I signified my unwillingness to rest my opinions upon a basis so narrow, as that which he had endeavoured to establish. I stated that I did not deem it necessary to appeal to his excellent observations, proving certain attributes of acidity to exist in one case, those of alkalinity in the other. I alleged my definition to be founded on the conviction that the property of affecting vegetable colours, on which that sagacious chemist lays so much stress, has not, latterly, been deemed necessary in acids; and that in bases it never was required. As respects them, it only served as a mean of subdivision between alkaline oxides and other oxibases.

I am at a loss to discover in what part of my letter there was any language which could convey the erroneous impression, that, in defining acids and bases I proposed to overlook properties, and to be regulated by attention to the number

of atoms in a compound. Certainly nothing was more foreign to my thoughts.

It is assumed by Berzelius that the saturation of the fluobase of potassium by fluohydric acid, cannot be considered as analogous to the saturation of the oxybase of potassium by sulphuric acid; because the resulting compound is to the taste in one case neutral, in the other sour. In reply I suggested that if the salidity of the biborates and bicarbonates was not to be questioned on account of their alkaline taste, nor that of the protochloride of tin on account of its sourness, it was not consistent that the pretensions to salidity of the fluohydrate of the fluobase of potassium should be denied on account of its sour taste. I will now add that if the fluosilicate of potassium be a double salt, the fluoride of silicon one of its two constituents must be a simple salt, and yet it is sour. If a simple salt may be sour, why may not a double salt have this attribute; and how in fact can its presence be inconsistent with salidity? Is not the absence of this characteristic in silica and tannin, and many other acids, as much against their claims to acidity, as its presence in other compounds is an objection to their association with saline bodies. It is considered by Berzelius an objection to the views which I have espoused, that the halogen bodies, while forming acids with various metallic radicals which oxygen does not acidify, do not form acids with sulphur, phosphorus, and arsenic which oxygen does acidify; yet what is there in this, more difficult to reconcile with the established results of chemical combinations, than in the fact that oxygen forms with sulphur, phosphorus, and arsenic, strong acids, with hydrogen water; while with hydrogen the halogen bodies all form compounds which Berzelius describes as having the highest pretensions to acidity. The highly active acid properties of the fluorides of boron and silicon, would lead us to expect similar compounds to be formed by the same radicals, with the other halogen bodies, contrary to experience. Chemistry makes us acquainted with many similar discordances. How is it that oxygen forms aëriform compounds with an extremely fixed body in the instance of

carbon; while in that of phosphorus or arsenic, both volatilizable, it forms acids which are comparatively insusceptible of volatilization? Wherefore does not hydrogen produce an acid with phosphorus and arsenic, as well as with sulphur?

According to Berzelius, all the halogen bodies produce with hydrogen combinations which are as highly endowed with the attributes of acidity, as the strongest acids into which oxygen enters as a constituent. It is conceded in his letter that his language respecting these combinations cannot be reconciled with his declaration in one place that they do not combine with oxybases, and in another that a body which cannot so combine is not an acid. It strikes me, that the only way in which the admitted inconsistency of his description of these bodies, with his definition of acidity, can be avoided, is by assuming that they combine as acids with haloid bases, although decomposed by oxybases.

I will now proceed to comment on a new subject for consideration, presented in Berzelius's letter in reply to mine.

It must be evident that every oxysalt, composed of an oxacid and an oxybase, must consist of an atom of each radical, and as many atoms of oxygen as exist both in the acid and in the base. Thus sulphate of potash consists of an atom of potassium, an atom of sulphur and four atoms of oxygen, and may be represented either by SOOO KO or SOOOOK.

Berzelius in his letter repeats an ingenious suggestion previously advanced in his treatise, that SOOOO, (sulphur with four atoms of oxygen,) may act, as a compound halogen body like cyanogen, and thus form a salt by union with an atom of any radical. He conceives that the apparent want of analogy, which induced him to separate into two classes, the amphigen and halogen bodies, disappears under this view of the phenomena; and that his amphide salts might be considered as constituted of a compound halogen body and an elementary radical. But however we may admire the ingenuity of these suggestions, ere, in obedience to them, we extend the limits of the halogen class, I would request that the word salt should be defined, and that it be shown that consistently

with any definition which can be devised, there is any class of bodies in nature which merit the appellation of salt-producers. Before enlarging the superstructure, let it be shown that the basement has been well grounded.

Berzelius lays some stress on the community of effect, in the evolution of hydrogen, both by acids formed by hydrogen with halogen bodies, and by diluted hydrous sulphuric acid, as evincing a similitude of composition justifying the suggestion above quoted from him. But I conceive that this common result is better explained by ascribing it to the tendency of radicals to displace each other from combination, whether existing in a simple or a complicated compound. If water exists as a base in hydrous sulphuric acid; as I have elsewhere suggested, we may consider this hydrous acid as a sulphate of the oxybase of hydrogen; and that when it reacts with zinc or iron, the proneness of hydrogen to the aëriform state enables either metal to take its place, agreeably to the established laws of affinity.

It may be proper, before concluding, to explain more particularly the nomenclature which I have adopted.

The amphigen, and halogen bodies of Berzelius, as they produce acids and bases according to my definition, are all classed as basacigen bodies. Of course oxygen, chlorine, bromine, iodine, fluorine, cyanogen, sulphur, selenium, and tellurium, are included in this class.

The general designation of a binary compound of a basacigen body, is the termination in *ide;* the special, the termination in *acid,* when the compound acts as an acid, in *base,* when it acts as a base.

Hence an oxide, may be an oxacid, or an oxybase;

a chloride,	a chloracid,	or a chloribase;
a bromide,	a bromacid,	or a bromibase;
an iodide,	an iodacid,	or an iodobase;
a cyanide,	a cyanacid,	or a cyanobase;
a sulphide,	a sulphacid,	or a sulphobase;
a selenide,	a selenacid,	or a selenibase;
a telluride,	a telluracid,	or a telluribase;

Compounds which consist of radicals only, are distinguished by the term *uret* equivalent to the French *ure*. Hence *carburet, phosphuret, boruret, silicuret, &c.*

Of any two binary compounds containing each the same basacigen body and forming one compound, the more electro-negative is an acid, the other a base. Hence all the electro-negative haloid compounds in the BERZELIAN double salts, are acids, and the electro-positive, bases. Where there are two such compounds one containing one basacigen atom, the other two atoms or one and a half, the former has a termination in *ous*, the latter in *ic*. As for instance the *chlorureplatinoso-potassique* of BERZELIUS, is a compound of *chloro platinous acid*, and the *chlorobase of potassium*, and is the *chloroplatinite of potassium*. The *chlorureplatinico-potassique* of the same author, is the *chloroplatinate of potassium.**

By analogy the intelligent reader may easily make these examples a clue to designate any other of the double salts of BERZELIUS so as to accord with the plan in question. He may have a *bromoplatinate* or *bromoplatinite*, a *iodoplatinate* or *iodoplatinite*, a *fluoplatinate, &c.*; or changing the radical a *chloroaurate* or *chloroaurite*, a *bromoaurate* or *bromoaurite &c.*

The terms amphigen and halogen being employed both from expediency, and in honour of their author, we may use his terms haloid and amphide, to distinguish the acids or bases severally formed by these classes, the abbreviations *halo* and *amph*, being employed in composition. Thus I designate the

* In designating salts of the metals proper, as for instance, the *nitrate of mercury;* the idea of the oxydisement of the metal is always understood, although usually not expressed. In the instance above cited, we actually mean the *nitrate* of the *oxide*, or *oxybase* of mercury. By analogy, I here use the term *chloroplatinate of potassium*, for *chloroplatinate* of the *chlorobase* of *potassium*. It is in fact, well known to Chemists, that acids do not unite directly with metals. The only alleged exception to this rule, of which I have any knowledge, is that of tellurium and sulphuric acid. It is inferred, therefore, that when an acid is combined with a metal, the latter must exist in the state of a base formed with the basacigen body which enters into the composition of the acid.

acids formed by the halogen bodies with hydrogen, as halohydric acids; those formed with that radical by the amphigen bodies, as amphydric acids. As the same radical will in other cases be found to form acids with several of the halogen bodies, platinum for instance, the acids thus produced, may be called haloplatinic acids ; or if gold were the radical, they would be called haloauric acids. These examples will suggest to the chemical reader a series of names, as for instance *haloargentic, halocupric, halostannic, halopalladic.*

I consider prussian blue as a cyanoferrite of the cyanobase of iron, or briefly a cyanoferrite of iron. The diversity of properties which enables two cyanides of iron to exist in combination in this cyanoferrite, one as an acid, the other as a base, is one among many other instances in which compounds constituted of the same elements in the same ratio, have different properties, and are said in consequence to be *isomeric*, or to afford cases of *isomerism.*

The salt designated by Berzelius as the "*cyanure ferroso-potassique,*" is the well known test for iron heretofore called ferroprussiate of potassa ; under the idea that it consisted of prussic acid, iron, and potassa. As the prussic acid was viewed at the same time as a compound of hydrogen and cyanogen, the ferroprussic acid was considered as a compound of cyanogen, hydrogen, and iron. According to Berzelius, the supposed *ferroprussiate* is a compound of a "*protocyanure*" of iron, and a "*cyanure* of *potassium ;*" each being a simple haloid salt, and the aggregate a double "*cyanure.*" Agreeably to my nomenclature, the "*protocyanure*" of iron is considered as cyanoferrous acid, and the "*cyanure*" of potassium as a cyanobase; the aggregate being a cyanoferrite of the cyanobase of potassium, but designated briefly as a cyanoferrite of potassium.

I infer that the "*ferroprussic*" acid is analogous in constitution to the triple compound of fluorine, silicon and hydrogen, improperly called hydrofluosilicic acid; and that, consistently with the hypothetical views under which the latter received its name, the former should be called hydro-

cyanoferric acid. Even admitting the correctness of the hypothetical impression, to which I have alluded, agreeably to which such compounds are acids with a double radical, I urged that the appellations of such compounds should be so altered as to give precedency to the electro-negative ingredient. Hence the one would be called cyanohydroferric acid; and the other, fluohydrosilicic acid. But in my letter to SILLIMAN, already cited, I advanced a new hypothesis respecting the constitution of the fluohydrosilicic, and fluohydroboric acids. I suggested that they should be considered as compounds in which the fluorides of silicon or boron acted as acids, the fluoride of hydrogen as a base. Consistently with that doctrine, I would consider the *protocyanide* (or "*cyanure*") of iron in the alleged *ferroprussic acid*, as acting as *cyanoferrous acid*, the *cyanide* of *hydrogen* (*prussic acid*) as a *cyanobase* forming, by their union, a cyanoferrite of hydrogen.

As compounds, consisting of a basacigen body, hydrogen and a radical, do not, when presented to bases, enter into combination; but are, on the contrary, decomposed so as to allow another radical to take place of their hydrogen, it is inconsistent with chemical law, as stated by BERZELIUS,* or my definition of acidity, (page 9,) to designate them as acids.

I have called the electro-negative "*protocyanure*" of iron of BERZELIUS, cyanofer*rous* acid, because there is "sesquicyanure" in the *cyanureferrico-potassique*" of that author, which, by analogy with the nomenclature of the oxacids, is entitled to the appellation of cyanoferric acid.

* Traite, page 41, vol. ii.

ART. II.—NOTES ON FALSIFICATIONS AND ADULTERATIONS.

No. I.

There is no species of fraud so criminal as that, which, prompted by a sordid desire after "filthy lucre," cheats mankind out of life or health. It cannot be denied that this evil is rapidly increasing, and perhaps as much so in the department of Pharmacy as in any other. In this state of things the question naturally occurs, whether it be not the *duty* of the honest pharmaceutist and physician to do all that single or combined efforts can accomplish to protect the community from its effects. The Philadelphia College of Pharmacy has, at one time or another, taken up the subject, and the pages of its Journal will testify to the zealous endeavours of its members to raise the moral character of the profession, and purify the drug market from some of its most obvious pollutions. But their researches and expositions, except within the precincts of their own body, have scarcely been sufficient even to keep pace with the "natural increase;" and it would almost appear that we have become at length discouraged from any further contention against this many-headed monster. But it cannot be supposed that the College of Pharmacy will really sit still, and quietly look on the progress of that evil, the prevention of which was one of the main objects of its institution. Its members have almost daily before their eyes instances of adulteration or falsification, the detection of which, if brought into public view, would produce a powerful and salutary effect; and it is with the view of affording a channel for the exposure of these frauds, that I have ventured to commence the present series, in the hope that my fellow members will promptly aid in the attempt. I would invite

intelligent pharmaceutists generally, to keep notes of all such instances of adulteration and falsification as may from time to time fall under their notice, and send them for insertion in this Journal. By this means we may eventually obtain a body of as useful information, respecting the corruptions existing in our own drug and chemical market, as the valuable work of Bussy and Boutron-Charlard embraces with regard to those of France.

Balsam of Fir.—A druggist of another city offered us an article under this name at such a price as to excite suspicions respecting its quality. On inspection and inquiry it appeared to be Chio Turpentine, the resin of the Pistacia Terebinthus, and not of the Pinus Balsamea. It is of a deeper colour than the true Canada Balsam, and of a stronger smell. It is put up in bottles similarly to the genuine article, which it pretty closely resembles.

Iodine.—A lot of Iodine, purchased some months since, appeared very partially soluble, and was found to contain a considerable proportion of powdered coal. The coal had been powdered rather coarsely, and the impalpable portion sifted out and rejected, leaving it in particles about the twentieth of an inch in diameter, which were readily merged in the mass of the Iodine. No note was taken at the time, either of the proportion of the adulteration, or of the country whence the Iodine was imported.*

Potassæ Citras.—We imported from London a few months ago an article under this name, which we supposed of course to be an actual combination of potassa and citric acid. It was found, however, to be a mere *mixture* of bicarbonate of potassa with the powdered acid and an agreeable proportion

* Since writing the above, I observe a similar adulteration of Iodine mentioned by Bussy & Boutron-Charlard as having been detected by Chevallier.

of sugar,—all the ingredients having been well dried to prevent combination. The mere solution of it in water, which was accompanied by an evolution of carbonic acid, formed a most agreeable diaphoretic medicine; but it is obvious that the article was not entitled to the name by which it was sold, the quantity requisite to produce a certain effect on the system being much and uncertainly larger than that of the citrate of potassa, inasmuch as an unknown proportion of its weight was sugar and carbonic acid.

Benzoic acid.—I bought, a few days ago, 2 lbs. of "benzoic acid" from a manufacturer, who stated in strong terms his determination to make none but *pure* chemicals. The sample from which I ordered it, was apparently a beautiful article, and at a rather lower price than is generally demanded. The acid when brought was declared to be perfectly pure. My attention was soon afterwards directed to it by B. F. Hoeckly, an apprentice in our establishment, who, in bottling it up, found it full of gritty particles of a sweet taste, which he suspected to be sugar. On examination, by attempting the solution of two separate portions respectively in *cold* water, and in highly concentrated alcohol, I found that it contained 50 *per cent.* of powdered white sugar. The alcohol dissolved the true acid, leaving 50 *per cent.* of sugar insoluble in that menstruum; and the water, which was of a winter temperature, dissolved the sugar of the other sample, leaving an equal quantity of true benzoic acid, which was separated by filtration. This purchase, which was our first, was of course also our last transaction with the house in question.

Antimonii oxidum.—This oxide, besides its medicinal uses, is sometimes used as a colouring matter for enamel painting. A manufacturer of porcelain teeth lately complained of the quality of some which we had ourselves imported from London last year. He suggested that it must be adulterated, as it would not produce the colour desired. It had

the dirty yellowish white appearance of the true oxide; but on examination we found that it effervesced by the addition of a strong acid. I accordingly submitted 100 grains to a more strict investigation. Muriatic acid was added until the evolution of carbonic acid ceased. The mixture was diluted with water, and filtered. The portion remaining on the filter, when dried, weighed 70 grains, and proved to be real oxide of antimony. To the filtered solution was added a solution of oxalate of ammonia until it ceased to act. The precipitate thus formed, which was oxalate of lime, was washed and dried, and weighed 42 grains. As oxalate of lime consists of one atom of the acid, (= 36) united to one of lime, (= 28) and one of water, (= 9) and as carbonate of lime is composed of one atom of lime and one of carbonic acid, (= 16) the above quantity of 42 grains of precipitate indicated an adulteration of nearly 29 grains, or, (allowing a little for loss,) say 30 *per cent.* of carbonate of lime. It is scarcely needful to add that this result suggested the propriety of subjecting the whole of what remained of this imported article to ablution by dilute muriatic acid.

Wm. Hodgson, Jr.

Philadelphia, 2d mo. 20, 1837.

ART. III.—CAPSULES OF GELATIN.

(*Capsules Gelatineuses; Dublanc et Mothes, a Paris.*)

By Alfred Guillou, Graduate of Phil. Coll. Phar.

There are many medicines whose administration would in numerous cases be productive of very beneficial effects, were it not absolutely prevented by their strong or disagreeable taste. Of this class are the turpentines and many of the gum resins, oil of croton, creosote, &c. &c., and last, though by no means least, the balsam copaiba. Notwithstanding the many ingenious formulæ adopted for the purpose of concealing the odour or disguising the nauseous taste of this latter drug, there

are many cases in which these being but imperfectly accomplished its use is necessarily prevented. The gentlemen above named are certainly entitled to the credit of having invented the most ingenious and best devised mode of administering this medicine, in the way indicated by the title of this article. Having observed that their "*capsules*" of balsam copaiba produced the effects desired, from the use of that remedy, and that they were taken by the patient without any nausea or repugnance, I was immediately struck with the propriety of the suggestion made by the inventors, that these capsules could advantageously be employed in the administration of various other pungent or disagreeable medicines, and for this purpose might readily be kept on hand by our apothecaries, to be filled with such articles and in such doses as physicians' prescriptions might from time to time direct. Under this conviction, I instituted a number of experiments, from which I have learned the mode of manufacturing the "capsules," which I now proceed to detail, and it may not be amiss to state that so close was the imitation and so nearly does the article manufactured according to the following process resemble the imported, that many of those made by me were sold as French, by dealers who purchased from me. Believing that this mode of administering the balsam referred to, and of applying the most acrid medicines to the interior stomach without disagreeably affecting the mouth will naturally supersede all others, I take great pleasure in submitting it for publication in the Journal.

The apparatus necessary for manufacturing the article in question, is certainly not extensive and by no means costly. Provide a suitable number of narrow tin dishes, about eighteen or twenty inches in length, half an inch in depth, and about two inches in width. In the length of these, and in a line, plant or solder at the distance of one inch from each other a number of smoothly turned metallic knobs of an ovoid shape, whose apex, having been somewhat lengthened out, forms a thin neck by which they are attached to the tin dishes. This

neck may be of about half an inch in length. Procure a sheet of tin, and perforate it with round holes, of which the diameter will be equal to the thickness of the knobs. Having greased the knobs well with lard, so as not only to prevent any adhesion to them, but also the adhesion of the inner sides of the capsules to each other after casting, pour melted glue (the most transparent having been selected) upon them and allow it to become tolerably stiff. If you think the shell is too thin, a second coat may be poured over the first. The capsule having been thus cast is allowed to cool down to about the consistence of common india rubber, and, having run a knife around the neck, you twist it briskly around and pull it upwards off from the knob. *It will immediately collapse and lose the form imparted to it on the mould, but if laid aside to dry, will by the time it has hardened have regained the desired rotundity.* Place it upon your perforated tin or "filler" and you can thus conveniently fill it with the article prescribed. A small piece of moistened goldbeaters' skin serves to cover the opening, and is easily concealed by the application of a thick coat of a solution of gum arabic with a camel's hair pencil. This last part of the operation being intended solely for the "finish" of the article, is only necessary in those cases where it is proposed to keep a supply on hand already filled, and need not be adopted where the immediate use of the remedy dispenses with any necessity of so rigidly consulting appearances.

SELECTED ARTICLES.

ART. IV.—NOTE UPON THE DISTINCTIVE CHARACTERS OF CALISAYA BARK. By M. GUIBOURT.

AT the last meeting of the Society of Pharmacy, I presented on the part of Mr. A. Delondre a specimen of bark, in large broad flat pieces, which to a certain extent resembled the Calisaya, but which furnished when manufactured, only two drachms of sulphate of cinchonia, and no sulphate of quinia. Upon the present occasion I think it will be useful to review the characters belonging to the true Calisaya bark.*

It may be covered with the exterior *crust,* or be deprived of it, which circumstances are designated in commerce by the terms Calisaya with the peel, *(Calisaya en ecorce)* and peeled Calisaya *(Calisaya mondé.)*

That with the peel (epidermis) is obtained both from the young and old branches and from the trunk. In the first instance the epidermis is thin, very rugose, hard, often of a grayish colour externally, but brown internally. It is deeply furrowed longitudinally and more especially so transversely, and when detached from the liber, which is frequently the case, it still leaves deep transverse impressions which corres-

* It ought to be written Colisalla, as Laubert has remarked in the Bulletin de Pharmacie, T. II. p. 302. There does not exist a province of Peru named Calisaya, which has given its name to the bark, as has been supposed upon the faith of a celebrated traveller. According to Dr. Poeppig, whose memoir upon the Huanuco barks I will probably soon publish in French, colla means remedy, and salla means a country full of rocks.

pond to the fissures in the part removed. In contradistinction to the preceding characters, every bark of which the cortical portion is shining, not rugged, not marked with numerous transverse fissures, is not true Calisaya, and ought to be considered unfit for the manufacture of sulphate of quinia. By this mode of distinction, the younger portions of the barks which I have described under the names *orange yellow, (Q jaune orangé,)* or *light Calisaya (Calisaya leger,) the Columbia bark (Quinquina de Columbie,) the white bark of Loxa (Q. blanc de Loxa,) Carthagena bark (Q. Carthagene,)* and Cusco bark *(Q. de Cusco,)* will be excluded.

It is very difficult to indicate in writing, the differences which distinguish the young Calisaya with the epidermis from Loxa and Lima barks, and from the red bark destitute of warts. The latter, however, is easily recognised by the marked red colour of its liber, and it commands so high a price, as to induce little fear that it may be substituted for Calisaya. As regards the two first, they are recognised by their epidermis, which is more uniform and less deeply cleft, and by the greater degree of adhesion between this portion and the liber, which is less fibrous, more compact, with the fracture often short and resinous. Their taste is both astringent and bitter, while the Calisaya has always an extremely fibrous fracture and a very bitter taste, with little astringency. Finally the test, by the sulphate of soda which I have pointed out, can allow of little doubt. This test consists in coarsely pulverizing a small quantity of the bark, triturating the powder in a porcelain mortar with water so as to form a liquid pap, and then filtering. Upon adding a few crystals of purified sulphate of soda to the filtered liquid, an abundant white precipitate is formed with the Calisaya bark, while no pale bark possesses this property.

When the Calisaya bark is obtained from the large branches or trunk of the tree, the epidermis is thicker, even sometimes as much as an inch in thickness. It is still more rugose and more deeply cracked, but the furrows do not penetrate to the liber, which no longer exhibits the circular

impressions perceptible upon the younger pieces. The epidermis is formed of laminæ applied one upon another, of a *deep brown colour*, containing between them a *reddish* pulverulent substance, intermixed with white fibres. It must here be remarked that the colour of the laminæ is deeper than that of the interposed pulverulent matter, because this character distinguishes the Calisaya, in large unpeeled pieces, from all others. Thus the wartless red bark in flat pieces, apart from the red colour of its liber, resembles to an astonishing degree, the unpeeled flat Calisaya; but the epidermis is formed of grayish laminæ which enclose a pulverulent substance of a bright red colour, and the bark presented by M. A. Delondre, which is a kind of ligneous Columbia bark, is provided with an epidermis formed of micaceous white laminæ, containing a red pulverulent substance, and where this substance is wanting, the liber is simply covered with a thin white micaceous layer, which is entire and without fissures. This bark ought to be pointed out to pharmaceutists, because skilful dealers, who pretend to pass for honest men, colour it red, either by a weak alkaline solution, or with an infusion of logwood, and pass it for red bark. We have seen such an article in the possession of a number of pharmaceutists during the past year.

It now remains for me to speak of the peeled Calisaya bark. The best is that which is quilled, compact and heavy. That which is in large flat pieces is of an inferior quality. In addition, this bark is always very fibrous, of uniform texture, and in every part of a yellow colour. Its external surface is angular, or as it were, compressed irregularly. Every kind of bark which exhibits a more fibrous texture internally than externally, which is marked with two distinct colours, a whitish hue internally and a reddish tint externally; finally, every kind which presents a well defined, uniform, regular exterior surface, is to be suspected. Such a variety of bark may, however, be extremely active as a medicine, and contain much of the alkali. Such are those justly esteemed which I have de-

scribed under the names of orange yellow, and Columbia barks. (Hist. abrég. des drog. simpl., nos. 489 and 490) ; but this alkali consists in a large proportion of cinchonia, and these barks are of little value in the manufacture of sulphate of quinia. I finish this note by a passage extracted from a letter of Mr. Christison, Professor of Materia Medica, at Edinburgh, the publication of which may be agreeable to the friends of natural science.

"You have long since, I doubt not, arrived at the conclusion, that notwithstanding the travels of many scientific men, we have as yet but few positive data with regard to the species which furnishes the most valuable bark, and you think, perhaps with me, that naturalists have placed too much reliance on their collectors of plants. A young accomplished botanist, named Gardiner, a pupil of Mr. William Hooker, of Glasgow, has just proceeded to South America, and proposes to remain some time in the bark forests. I had an opportunity of conversing with him previous to his departure, and I strongly impressed upon him, not to trust to specimens obtained second hand. He has promised to collect himself all sorts of botanical specimens and barks, and to make his researches upon this subject so complete, as to be able to come at positive results. He has engaged to make known his progress through Mr. Hooker, and it will give me great pleasure to communicate it to you. It may be as well to add, that Mr. Gardiner proposes to defray the expense of his travels, by furnishing the cabinets of naturalists with specimens at a moderate price. So that if there should be any persons or societies in Paris to whom they will be an object, the voyage of Mr. Gardiner will present the opportunity of obtaining them. I believe that the price will be sixpence for every species of plant, from South America, indifferently."

Journal de Pharmacie.

ART. VI.—ON NITRIC ETHER. By R. Hare, M. D., Professor of Chemistry in the University of Pennsylvania.

This ether may be obtained in a diluted state, by distilling alcohol with diluted nitric acid, or with nitre and sulphuric acid. When sulphuric acid is used, the product is liable to consist in part of sulphuric ether.

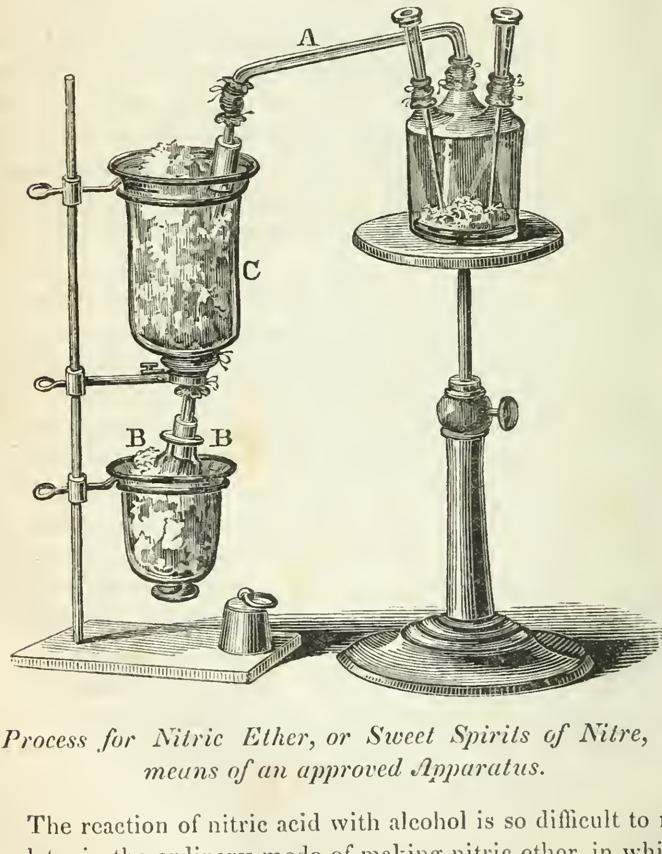
Thenard informs us that to obtain pure nitric ether, equal parts of alcohol, and of the nitric acid of commerce, may be mixed and distilled with great caution, the product being passed into a series of Woulfe's bottles, the first empty, the others half-filled with brine, and surrounded by a freezing mixture. As soon as the reaction commences, it increases rapidly, so that it is necessary to check it by cooling the retort.

I subjoin an engraving and description of an apparatus which I have contrived for generating nitric ether.

I am of opinion that it would be advantageous, if the prescriptions of our physicians were made with reference to ingredients of a high degree of purity. The physician should know how much real nitric or sulphuric ether is contained in the diluted article which he directs his patient to use. Hence pure nitric or sulphuric ether should be prescribed, adding as much alcohol or water as he may deem necessary. Agreeably to the present practice, it is in the power of manufacturing chemists to impoverish ethereal preparations with little danger of detection.

Pursuant to the London Pharmacopœia, three ounces of nitric acid, by distillation with a quart of alcohol, are allowed to produce twenty-four fluid ounces of sweet spirit of nitre. According to Thenard, the quantity of ether, when the materials are in the ratio of equality, amounts to two-thirds of the weight of the acid. Hence it is probable that the quantity of ether in the twenty-four fluid ounces of sweet spirit of nitre, obtained as above mentioned, is not more than two ounces.

I infer that sweet spirit of nitre of a more uniform strength, would be obtained by the addition of alcohol to pure nitric ether, to an extent no more than adequate to render it soluble in water; and then adding water to the alcoholic solution until the ether should form only a twelfth of the aggregate. In a preparation thus made, the properties of the ether would not be unnecessarily associated with those of alcohol, as in the usual officinal preparation.



Process for Nitric Ether, or Sweet Spirits of Nitre, by means of an approved Apparatus.

The reaction of nitric acid with alcohol is so difficult to regulate, in the ordinary mode of making nitric ether in which the whole of the materials are mingled at the outset of the

process, that I was induced, about twelve or fifteen years ago, to introduce an apparatus in which they were gradually added together within a glass bottle, by means of glass funnels with glass cocks.

Subsequently I adopted the more simple apparatus represented in the accompanying figure.

Providing a bottle with three tubulures, let one tubulure communicate by means of a recurved tube A, with another tube passing perpendicularly through an open-necked inverted receiver C, and entering a bottle surrounded with ice and salt, occupying a suitable vessel B B. The cavity of the receiver should likewise be occupied by a freezing mixture.

Into each of the remaining tubulures let a glass tube be introduced, ground or luted to fit air tight, and tapering so as to terminate in a capillary orifice near the bottom of the bottle.

Through one of the tubes introduce as much alcohol as will cover the bottom of the bottle, and then, by means of the other tube, introduce as much strong nitric acid as will cause an effervescence. Should the effervescence threaten to become explosive, the reaction may be checked by the further addition of alcohol, and when the reaction appears to decline too much, it may be re-excited by an additional quantity of acid. By these means, without applying heat, a quantity of nitric* ether will soon be condensed in the refrigerated bottle. To convert this ether into a liquid, fully equal to the officinal sweet spirits of nitre, let it be mingled with seven parts of alcohol, and four of water.

The colder the freezing mixture, the greater will be the

* I incline to the opinion that this ether is a compound of etherine with the "*hiponitrous*" acid of the British chemists, consisting of three atoms of oxygen and one of nitrogen. This compound is by Berzelius called "*nitrous*" acid: as the name of this acid is doubtful, and as it is possible that new light may be thrown on the composition of this liquid, it appears to me inexpedient at this time to change the name by which it has for many years been known.

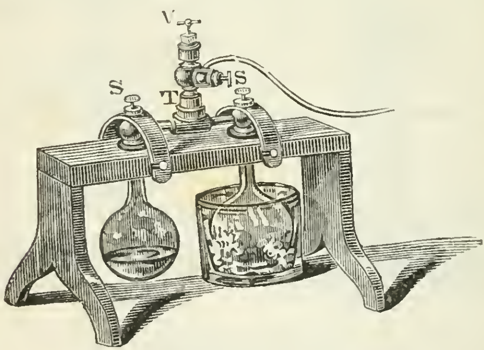
product; yet more or less may be obtained by refrigeration with cold water.

It may be proper to mention, that at the bottom of the phial an aqueous acid liquor is deposited, upon which the ether swims, and from which it should be carefully separated.

ART. V.—IMPROVED CRYOPHORUS. By R. Hare, M. D.

Professor of Chemistry in the University of Pennsylvania.

Two flasks, of which the necks have flanged orifices, are so secured in a wooden frame, that by the pressure of screws S S, and gum elastic disks, the orifices of a tube are made to form with them severally, air tight junctures. The orifices of the tube are furnished with brass flanges, which correspond with those terminating the necks of the flasks.



Midway between the junctures a female screw is soldered to the tube for the insertion of a valve cock V, by means of which, and a flexible tube extending to an air pump, the flasks may be exhausted, and then closed. A small quantity of water having been previously introduced into one of them, if, while

the exhaustion is sustained, the other flask be refrigerated by ice and salt, the water will be frozen.*

The intelligent chemist will perceive that this apparatus may be applied to the purpose of desiccation by placing the article to be dried in one receptacle, and quick lime, chloride of calcium, or concentrated sulphuric acid, in the other. The orifice of the receptacles may be made larger without inconvenience. Two large cylinders, for instance, may be used.

I propose, as soon as I have leisure, to apply the principle illustrated by this apparatus, to the distillation or desiccation of many substances which are liable to injury when exposed to heat, or air. I conceive that there is, by means of analogous apparatus, a fruitful field for improvement in the arts. I am of opinion that it may be employed in the preservation of meat, milk, fruit, vegetables, and the making of cheese; also in pickling and preserving.

In these processes it would remove the necessity of resorting to a high temperature to expel water, by which means the flavour of the fruit is injured.

* For the information of readers who may not be chemists, I subjoin the following explanation of the cause of the congelation of the water.

So long as no condensation is effected, of the thin aqueous vapour, which, when water is present, must occupy the cavity of the instrument, that vapour prevents, by its pressure, or tension, the production of more vapour: but when, by means of cold, the vapour is condensed in one bulb, its evolution in the other, containing the water, being unimpeded, proceeds rapidly. Meanwhile, the water becomes colder, and finally freezes, from losing the caloric which the vaporization requires.

According to Wollaston, one grain of water, converted into vapour, holds as much caloric as would, by its abstraction, reduce thirty-one grains from 60° F. to the freezing point; and the caloric requisite to vapourize four grains more, if abstracted from the residual twenty-seven grains, would convert them into ice.

ART. VII.—OF THE CALAGIRAH OR CALAGERI OF INDIA, VERMIFUGE SEEDS PREFERRED TO THE SEMEN CONTRA. By J. J. Virey.

There has been sent to us from Calcutta, under the denominations of Calageri, or Calagirah, some very small black seeds, which are bitter, of a slightly aromatic odour, and contain volatile oil; their form is polygonous, acute at their inferior extremities. We have determined them to belong to a plant of the family Compositæ, division *Corymbiferæ*, (*Synanthereæ*, of H. Cassini,) and *Syngenesia*, *Polygamia Superflua*, of Linnæus. It is an annual herb, about five feet in height, with a straight, cylindrical, striated stem, filled with medullary substance. Its leaves are alternate, oval, lanceolate, acute, largely dentate. The flowers are of a purplish colour, showy; supported on simple peduncles and terminate the stalk, they have ligulate calycine scales; the florets are hermaphrodite.*

This plant which on account of its properties enjoys great celebrity in the East Indies, has been placed in the genus *Conyza*, L. It has been figured by Van Rheede,† by Burmann,‡ and described by Vaillant.§ It has been cultivated in the Garden of Plants in Paris, and is susceptible of being acclimated in France. It is the *Vernonia anthelmintica* of Willdenow,‖ the *Ascaricida anthelmintica* of Cassini.¶

In effect this bitter plant has been recommended in decoc-

* *Conyza foliis lanceolato-ovatis, serratis, scabris, pedunculis unifloris, calycibus squarrosis.*

† *Hortus Malabar*, tom. 2, p. 39 plate 24. *Cattu-schiragam* of the Hindoos.

‡ *Thesaurus zeylanic*, p. 210, tab. xcv.

§ Mem. Acad. Sc. Paris, an. 1719.

‖ Cultivated in the green house, under this name, at the Garden of Plants, it flowers in September.

¶ This genus has also been adopted by M. Decandolle, Prodr. tom. 5.

tion, administered internally as a remedy for gout, or applied as external fomentations for rheumatism, &c; but it is the powdered seeds, which is said to be the best vermifuge for ascarides and lumbrici in children. They are also efficacious in flatulent colic; if an infusion be administered, it acts upon the kidneys, and is serviceable in cough. As it is much less disagreeable to take than the *semen contra*, we are of opinion that it ought to be substituted for it, and this substitution will be easy, as the plant can be naturalized in our gardens. It must, however, be guarded against frost.

ART. VII.—FALSIFICATIONS OF WINE VINEGAR AND THE MEANS OF DETECTING THEM. By A. Chevallier.

Having been charged in 1833, as a member of the Counsel of Health, with the examination of specimens of vinegar, obtained from the cantines of several of the barracks of Paris, I thought it obligatory upon me to make some investigation into the purity of the vinegar sold in Paris, and the means employed to adulterate it. I directed a poor woman to procure for me, from such grocers as I designated, a certain quantity of vinegar, and upon these specimens, in number an hundred and twenty, I made my experiments.*

* The experiments made in Paris upon the purity of vinegar, originated from the information, that a large proportion of the vinegar sold in the departments was made up by the addition of sulphuric acid. Prior to this, at the commencement of the year 1833, the Deputy Mayor of Nantes, charged with the municipal police, had been informed that a large quantity of vinegar then in use had been adulterated; an investigation of the matter was made by the commissaries of police assisted by members of the counsel of health, and 116 casks of vinegar were seized, and afterwards, in consequence of judgment given, the vinegar which they contained was poured out in the public street.

Of these 120 specimens, there were

97 of pure vinegar,
17 of vinegar altered by sulphuric acid,
3 of vinegar containing acrid substances,
2 of vinegar containing copper,
1 of vinegar containing lead.

Our researches induced us to believe, 1. that many of the falsifiers, who are extremely ignorant, are not aware that they commit a crime by mixing foreign substances with their vinegar; 2. that others, equally ignorant, have purchased recipes to render their vinegar stronger, believing that by following these recipes they improve their merchandize;* 3. that there are others who increase the amount of their vinegar by sulphuric acid, well aware of what they are about, with the design not only of rendering it stronger, but of enabling them them to maintain a competition and obtain ready sales by underselling the market. However this may be, and whatever may be the reasons which induce dealers to sophisticate the vinegar sold by them, it is to be desired: 1. that correct authoritative information, upon the means of recognising the falsifications of vinegar should be obtained and published; 2. that pharmaceutists, who from their position and the studies with which they are occupied, possess the requisite knowledge, should be requested to examine, not only the vinegar, but also all other substances supposed to be sophisticated; 3. that severe laws should be enacted, which will be able to take hold of those who become guilty of a crime which can endanger the public health.†

* The following recipe, bought by a seller, has been communicated to us, as employed successfully abroad to falsify vinegar.

℞. Cremor Tartar, 1 oz; Sulphuric acid at 50°, 2 oz. Boil in a glass vessel, allow the mixture to cool and settle, pour off the clear liquid, which is very sour. This liquid in the proportion of several drops to the bottle of vinegar increases its strength.

† We will advert here to the following circumstances; that, but a short time ago, bakers were in the habit of introducing in the preparation of bread a poisonous salt, *the sulphate of copper*, for the purpose of obtaining

While we indulge the hope that instructions upon this subject will be published, we are induced to believe we are occupied with a work of utility, by indicating the means to be put in practice to detect falsifications of this kind; it is our design to publish subsequently other articles upon sophistications not less dangerous, which have fallen under our observation.

Means of detecting the sophistication of vinegar by sulphuric acid.

This mode of adulteration can be traced back to a period somewhat distant, and different methods have been pointed out in order to detect it; the best of these is based upon the employment of the solution of the muriate of baryta. It consists in pouring into the vinegar supposed to be falsified and diluted with water, a portion of this solution, which causes a yellowish flocculose precipitate, little abundant if the vinegar contains no sulphuric acid, and an abundant white granular precipitate, if the vinegar contains this acid.*

The precipitate furnished by the sulphuric acid is weighty, it quickly falls down, is insoluble in water and in nitric acid, it is converted into the sulphuret of barium when heated with charcoal; this precipitate, collected on a filter and washed with boiling water, indicates by its weight the quantity of sulphuric acid requisite for its production, as it is known that 100 parts of sulphate of baryta contain 33.6 of sulphuric acid and 66.1 of protoxide of barium.

The following method may also be employed, although it takes more time; still it is preferable. Take 100 grammes of the vinegar to be tested, place it in a porcelain capsule, heat it moderately, so as to reduce by evaporation the liquid to an

a greater degree of whiteness ! ! 2. that at the time of the cholera and since, mealy substances obtained from cabbage and radish were substituted for mustard meal, for the purpose of revulsion. In these latter cases the falsifiers were without doubt ignorant that they were guilty of the *crime of homicide.*

* A vinegar which contains only 1 part of sulphuric acid mixed with 99 parts of vinegar, exhibits these characters in a marked degree.

eighth of its volume, allow it to cool, the residuum is treated with four times its weight of alcohol at 40°; the alcoholic solution is filtered; distilled water is added; the alcohol is evaporated; then the solution of muriate of baryta is added until no more precipitate is thrown down; the precipitate is collected on a filter, washed with boiling water, dried, weighed and the weight of the acid deducted.

A very simple method of detecting the presence of sulphuric acid in vinegar is the following.* Take a certain quantity of the vinegar supposed to be adulterated, place it in a small porcelain capsule, or a platina vessel is better, then heat it to entire evaporation. If the vinegar does not contain sulphuric acid, the vapour which arises during evaporation, does not possess any peculiarity; if, on the contrary, it contains this acid, at the end of the operation, the vapour of sulphuric acid becomes apparent, which is white, dense and suffocating. This extremely simple manner of recognising the falsification of vinegar by sulphuric acid, does not indicate the proportion of the sulphuric acid introduced.

Methods of recognising the falsification of vinegar by muriatic acid.

Many modes have been proposed to detect this adulteration; the best is the following; take 100 grammes of vinegar, place it in a retort and submit it to distillation continued a sufficient length of time and so as to drive over all the acid into the receiver, then pour upon the distilled product a solution of nitrate of silver, which if the vinegar is pure should afford no precipitate, and which furnishes a white curd-like precipitate, insoluble in nitric acid, soluble in ammonia, if the vinegar contains muriatic acid. The precipitate of chloride of silver, is collected on a filter, washed and dried, then from its weight deduct the weight of the muriatic acid upon the basis of the established formulæ which assume that 100 parts of silver

* This method has been tried in the presence of several persons and it has appeared exceedingly simple and very convenient.

unite with 32.5 of chlorine, and that97.26 of chlorine absorb 2.74 of hydrogen gas, to form 100 parts of hydrochloric acid.

Method of recognising the presence of nitric acid in vinegar.

The falsification of vinegar by nitric acid is very rare, it is detected in the following manner; the vinegar is saturated with the carbonate of potassa, which is then evaporated to obtain a salt. When the salt is obtained in the dry state, an examination is made to ascertain whether it contains a nitrate: 1. by throwing a small quantity upon live coals; if nitrate of potassa is present, partial deflagration will ensue; 2. by treating this salt mixed with brass filings with sulphuric acid; if it contains a nitrate, reddish vapours are disengaged with the strong odour of nitrous acid, which is not the case if the salt obtained contains no nitrate.*

Method of testing vinegar mixed with oxalic or tartaric acids.

These sophistications which are scarcely now met with, can nevertheless be determined, 1. by the evaporation of the vinegar, which, when it contains these acids, leaves a crystalline residuum, a residuum which should be afterwards examined; 2. because vinegar thus adulterated, evaporated to two-thirds, and then poured into a solution of potassa, occasions a granular crystalline precipitate of the *oxalate* or the *tartrate of potassa*, which is not obtained when the vinegar does not contain these acids.

Method of recognising the alteration of vinegar by acrid substances.

The addition of acrid substances to vinegar is of ancient

* We have been assured that the vinegar makers have augmented their product by sulphuric acid containing nitric acid; we have never met with vinegar thus falsified, but we know that for some time, the sulphuric acid of commerce has contained a small quantity of nitric acid, arising from a new method of preparing it.

date. Lamarre in his *Traité de la Police*, says that vinegar makers add to their vinegar, red pepper in order to render it more pungent.

Some manufacturers introduce into the confection of vinegar, long pepper, pyrethrum, grains of paradise, mustard seed, and other acrid vegetable substances. The methods of detecting the presence of these substances, is to evaporate at a low heat this vinegar until it attains the consistence of an extract, then to examine the residuum, which has an acrid biting and even caustic taste, when these substances have been added.

Vinegar thus medicated, if tasted carefully can readily be recognised. In effect, it leaves upon the palate and in the throat an acrid, then burning sensation.

Means of detecting the presence of copper and lead in vinegar.

The presence of these mineral products, cannot be considered as a falsification, but as the result of negligence in the fabrication, or rather of the unfitness or of the bad choice of the utensils which have been employed for keeping the vinegar. The presence of these mineral preparations can be readily determined, 1. by sulphuretted hydrogen, which imparts a brown colour to the liquid and indicates the presence of lead and even copper; 2. by ammonia, which occasions a blue colour when the vinegar contains a salt of copper; 3. by the ferrocyanate of potassa, which occasions a grumous precipitate when a salt of copper is present; 4. by the chromate of potassa, which affords a yellow precipitate when a salt of lead may exist in the vinegar. But in order to render the effect of the reaction more sensible, it is better, when these salts are sought for in vinegar, to evaporate it to three-fourths and to experiment only upon the remainder, which will contain them in a less dilute state.

Of the modes of appreciating the strength of vinegars.

Many methods have been proposed to determine the strength of vinegar, that is to say, its degree of acidity.

These are, its saturation by potassa, by carbonate of lime, by ammonia, lastly the acetometer has been employed. This last, employed by dealers, is less efficient, for the density of vinegar may increase in an inverse ratio to its purity; thus an article which contains less acid, but a large quantity of salts and organic matters, exhibits a high degree upon the instrument; vinegar adulterated with sulphuric acid, also in this way indicates a degree of strength which is not due to the vinegar.*

From the experiments which we have made with the vinegar of Orleans,† compared with other specimens, we have demonstrated that vinegars, which, in the proportion of 100 grammes, saturate 80 decigrammes of subcarbonate of soda, do not exhibit upon the acetometer more than 2° 25′ whilst those which saturate but 60 decigrammes of the same salt, indicate upon this instrument the same degree (2° 25′.)

The process which we deem most satisfactory, in order to appreciate the strength of vinegars, consists in saturating them with the pure, well dried, subcarbonate of soda. The following is the manner of operating :—

Take the crystals of subcarbonate of soda, expose them to heat, collect the product of the desiccation, and reduce it to powder, which should be preserved in a glass ground-stoppered bottle. When it is intended to test a vinegar, 10 grammes are taken, and the quantity of subcarbonate of soda, required to saturate it, is noted. We have noticed that 10 grammes of most vinegars of good quality, sold in Paris, demand for their saturation from 7 to 8 decigrammes ; (from 14 to 16 grains) of the subcarbonate of soda.

We may likewise affirm that the employment of the instru-

*We have observed that the addition of sulphuric acid to the vinegar of Orleans, in the proportion of 5 to 100, caused the acetometer to stand at at 5°.75′ while prior to its addition, it only stood at 2°.25′.

† These experiments were made upon vinegars which were obtained from Orleans by a Pharmaceutist of that city, who was desirous of facilitating our labours.

ment called acetometer can lead to error, from its construction, dimensions, and the length of the divisions marked upon it. We have obtained the following results, when operating with two instruments bought in Paris, from two makers, MM. R. and L.

Orleans vinegar, No.	1.	*Acetometer L.*	2.90.	*Acetometer R.*	2.25
" "	2	"	3.	"	2.25
" "	3	"	3.10	"	2.50
" "	4	"	3.10	"	2.50
" "	5	"	3.	"	2.25
" "	6	"	2.80	"	2.25
" "	7	"	2.50	"	2.10

It is plain, from the above results, that not only these instruments, when placed in the same vinegar, do not indicate the same degree, but that, moreover, these degrees are not uniform as respects the differences. It is true, that upon one of the instruments, the divisions were very close together, and that it was very difficult to note the differences in all cases. The best acetometer will be that, which, from its size, presents upon its stem divisions so distant, that they can easily be observed.

We shall not conclude this note, without stating, that, for some time past, made up vinegars have been prepared at Paris: these do not contain the acidulous tartrate of potassa present in wine, but most generally a salt, the base of which is lime. These vinegars, which do not possess the freshness of wine vinegar, and which I have investigated, contain a small quantity of sulphuric acid ; but it exists in so small a proportion, that we are not of opinion that it is added to give strength to the article.

With this terminates what we have to say upon vinegars. We think that by employing the methods of experimenting which we have indicated, a guarantee is afforded against the frauds practised by the dishonest, to pervert a product, which, in the present state of our civil existence, must be considered as of the first necessity.

Acetic acid is also used to increase the strength of vinegar. A manufacturer of acetic acid, a few years ago, recommended the employment of this acid to increase the acidifying material. Vinegar makers, who could not obtain a good article from the wines of a bad year, followed the advice which was given them, and it was so profitable in the manufacture and sale, that, for some time past, its employment has not only been introduced for this purpose, but it is added to vinegar already formed.

Vinegar dealers pursue the same method, especially to give force and strength to the aromatic vinegars which they obtain by macerating fresh plants in vinegar: we may state incidentally, that the maceration of fresh plants is not only injurious because it weakens the strength of vinegar, but because it imparts to this liquid a peculiar disagreeable taste, while on the other hand, if dried plants are employed, the vinegar has more strength, and the aroma which it acquires is pleasanter.

The acetic acid which is employed to regenerate vinegar is obtained by treating the acetate of soda with sulphuric acid, distilling in suitable vessels, and collecting the acetic acid which passes over and becomes condensed. This acid should not contain sulphuric acid or metallic salts.

Additions by M. Julia de Fontenelle.

In the same manner as our honourable colleague, M. Chevallier, we have had the opportunity of convincing ourselves of the falsification of wine vinegar, especially in the interior of France. We have known many vinegar makers in the department of Aude, who place in a large vat the residuum of the distillation of red wine, with a fourth part of wine in weight, and a fourth of good vinegar; the degree of acidulation is finally given by sulphuric acid. The fabrication of this had almost cost the life of one individual. He had as a preliminary step poured into the vat about 100 pounds of the residuum of wine (*repasse*) with the quantity of sulphuric acid

requisite to make 18 casks of vinegar, he then descended into it to mix the liquid with his feet, the severe scalding which was the immediate result placed his life in great jeopardy. At Barcelona during the yellow fever, all the vinegar was consumed, I have been correctly informed that it was manufactured from 10 casks of water, 2 of vinegar and 1 of inferior wine, (to give colour to the vinegar) and a sufficient quantity of sulphuric acid.

To the methods pointed out by M. Chevallier we shall now add those, of which we ourselves have a knowledge. It is well known that vinegar manufacturers, instead of giving strength to weak vinegars by the addition of spirit, or some sugary substance, prefer to add some of the acids called mineral, principally the sulphuric, as much on account of the saving in price, as of the promptness of its operation. This fraud has been detected by Demarchy in some vinegars of Paris and especially in Champagne, at St. Dizier and among the retailers of vinegar.

M. Descroizilles has given a method of detecting sulphuric acid in vinegar, which we think should be noticed. This skilful manufacturer recommends touching a drop of the infusion of litmus, or litmus paper, with the suspected vinegar. If it is pure, the blue colour reappears after drying; if on the contrary it remains changed, it is a proof of the presence of an acid foreign to it. This test with litmus may approximately indicate the quantity of acid added. In effect, says M. Decroizilles, after the falsification of vinegar has been made evident and its acetometric degree has been determined, a new trial of saturation is commenced by pouring at intervals a demilitre of the acetometric liquid into it, and at each time touching a drop of the infusion of litmus with the vinegar in its several states of saturation; when the saturation is complete, and the litmus is no longer reddened, if the experiment indicates 12 degrees, there will be upon the pallet 24 red drops. The pallet is then slowly heated to dry them, and the number which remains of a red colour is counted. If 8 remain and if the

8th is a little reddened, it may be inferred that this vinegar owes one-third of its sourness to a foreign acid. If it has already been determined that it is the sulphuric, the quantity of acetometric liquid employed to saturate them is calculated, and in this way the proportions of sulphuric acid per litre which have been added, are obtained.

These experiments and calculations may appear a little difficult to those unacquainted with chemistry.

Nitric and muriatic acids can be detected in vinegar by saturating it with subcarbonate of soda, filtering and crystallizing. If the acid is muriatic, there will be found with the acetate of soda, a salt possessing a very saline taste, and in cubic crystals, while the other salt crystallizes in prisms. The proportion of muriatic acid can be determined by dissolving these salts and adding nitrate of silver. From the precipitate obtained, the weight of the muriatic acid may be calculated, from a knowledge of the constituent proportions of nitrate of silver.

If the sophistication is made by nitric acid, which is exceedingly rare, in consequence of the high price of this acid, a nitrate of soda is obtained, crystallizing in rhomboidal prisms, along with an acetate. The first salt has a cooling taste; it fuses upon coals like salt petre. The quantity of nitric acid can be determined by drying these two salts, and treating them with concentrated alcohol, which dissolves the acetate without touching the nitrate. From its weight the quantity of nitric acid is determined by its constituent principles.

It may happen that in commerce, muriatic or acetic acids may be mixed with sulphuric acid: to detect this last, a piece of linen or of paper should be dipped in the acid to be tested, it is then to be dried by the fire; if it is carbonized, it is an indication of the presence of sulphuric acid. It is evident, as a consequence, that there will be a want of precaution and of prudence, if free washing is dispensed with, after the employment of acids, both in bleaching and in brightening blue colours.

In general, in all the operations where the acids remain adherent to the stuff it is necessary to remove them, either by free washing, or alkaline solutions.

Journal de Chemie Medicale.

ART. VII.—ANALYSIS OF TARTAR EMETIC.

By Mr. Richardson.

Mr. Phillips' analysis of this salt, differing from Dr. Thompson's in the proportion of water which it contains, Mr. Richardson repeated the experiments of the latter, employing the same specimen. The analysis was conducted in the following manner: 25 grains were heated for a considerable time on the sand bath, at a temperature of about 400° F., and lost 1.21 grains or 4.84 per cent. The residuum was dissolved in water, and the antimony precipitated by sulphuretted hydrogen. The precipitate, after being washed and dried, weighed 13.3 grains. But 11 sesquesulphuret of antimony : 8 antimony : : 13.3 : 9.67 grains = 11.48 grains oxide of antimony. The liquid and washings from the above precipitate were carefully evaporated to dryness and the residual salt weighed 13.23 grains. From the composition of bitartrate of potassa, it follows that the result is,

Oxide of antimony,	45.92 atoms.
Potassa,	12.80
Tartaric acid,	35.25
Water,	4.84

These being resolved into atoms, give the following constitution:

Oxide of antimony,	4.83	2.26 atoms.
Potassa,	2.13	1.00
Tartaric acid,	4.27	2.00
Water,	4.30	2.01

The result of Dr. Thompson's analysis was

1.997 at.	tartaric acid,
1.92	protoxide of antimony,
1.	potassa,
2.139	water,

The mean of the two analyses:

Oxide of antimony,	2.12
Potassa,	1.00
Tartaric acid,	1.96
Water,	2.07.

Leaving no doubt of the true composition of the salt, being

2 at.	oxide of antimony,	19.00
1	potassa,	6.00
2	tartaric acid,	16.50
2	water,	2.25
		43.75.

Edin. Med. and Surg. Journal.

ART. IX.—EXTRACT FROM A REPORT MADE TO THE ROYAL ACADEMY OF MEDICINE, JULY 1836, UPON A METHOD OF PURIFYING COMMON MANNA, AND CONVERTING IT INTO FLAKE MANNA. By M. DAUSSE.

THE Academy, at its sitting, in April last, received a letter from M. Dausse sen., a Pharmaceutist of Paris, in which he announces a new mode of purifying manna in sorts by means of animal charcoal. This letter was accompanied by a specimen of flake manna obtained by the method indicated, for which the author solicits the approval of the academy.

The committee have thought the subject should be considered under three points of view.

1. Whether the method proposed by M. Dausse is new?

2. Whether there is a similarity of composition between the manna which he has purified and natural flake manna?

3. Whether there exists between the two articles identity of therapeutic properties?

The reply to the first question is furnished by Baumé in his Eléments de Pharmacie. Some persons, says this celebrated pharmaceutist, manufacture flake manna. To do this they dissolve common manna in a small quantity of water, allow the liquid to settle, decant it in order to separate the impurities, then inspissate it to that degree that it will become congealed upon cooling, they then suspend threads in it and immerse them several times in succession, after the method of the candle makers. This manna is a pretty good imitation of the flake manna, and it may be said that it equals it in quality, as it is nothing else than a very pure manna. Let us remark, in the first place, that at the time Baumé wrote this, vegetable analysis was yet in its infancy, that the employment of animal charcoal, as an agent for the removal either of colour or smell, was not known, and that notwithstanding there was obtained by the simple method of purifying manna which has been described, an article which had all the appearances of flake manna. Allow us to state in addition, that it was known to one member of the committee and to many traders, that a pharmaceutist of the school of Paris, M. Avequin, actually prepared, eight years ago at Port au Prince, in his house at Chaillot, a very beautiful manna in flakes, by treating, in the same way as M. Dausse, common manna with animal charcoal. We are not informed of the causes of failure to this speculation, but at the same time it is certain that the use of animal charcoal in the purification of manna was known in the year 1828.

Let us pass to the second question! is there parity of composition, or more rigidly, is the proportional relation between the components, the same in the manna purified by M. Dausse and natural flake manna? To answer this question, the Committee made some experiments, the principal re-

sults of which will be cited; but, in the first place it may be stated, that the manna of M. Dausse presents itself in stalactiform concretions, much resembling natural flake manna; that it is deprived if not of the whole, of at least a part of the nauseous odour peculiar to this substance. Some pieces have the whiteness of recent manna, while others more coloured resemble more the manna of two years standing. To equal whiteness of both kinds, the purified manna is less friable, it becomes more glutinous by trituration, it is also more hygrometric. Thus, as states the author in his letter to the Academy, flake manna prepared artificially, is completely dissolved in water without disturbing its transparency; let us observe at the same time that this solution is a little more coloured than that of natural flake manna, that it does not redden in the same way litmus paper, a result evidently due to the reaction of the free acid of the manna and the small quantity of carbonate of lime contained in the animal charcoal used in the purification. The purified manna, more soluble in boiling alcohol than natural manna, leaves nevertheless a small brownish coloured residuum, and what is remarkable, contains much less mannite. Thus we have obtained from the manna of M. Dausse but 44 per cent. of this principle, while the flake manna of commerce furnishes 68 per cent. As is manifest, the purified common manna, while it assumes the appearance of flake manna, contains one-third less of one of its principal elements, and as a necessary consequence, the gum and sugar do not exist in the same proportions. Therapeutic experiments alone can decide the question, to what degree do the two articles, differing in the proportion of their component parts, resemble or differ from each other in their medical properties. The member of the committee who especially undertook this part of the examination, has administered the purified manna to many patients under his care in the wards of the Hotel Dieu, and the following are his results:

Nine subjects of different ages, constitutions and pathological conditions, took two and a half ounces of manna each.

1	had		12 stools,
1	"		10,
2	"	from	5 to 6,
1	"		3 to 4,
1	"		1,
1	not observed,		
1	none,		
1	was vomited.		

The result was analogous to that obtained generally by the employment of any species of manna, which some persons digest entirely, and which others vomit after having taken. This proves, to remark in passing, how difficult it is in therapeutics to determine rigidly the action of certain medicines. For if manna purified as has been specified in this report, differs from flake manna by a small proportion of mannite, the principle to which many physicians refer its purgative property; if, on the other hand, the animal charcoal removes in a great measure the nauseous principle of the manna, in which, other authors state, resides exclusively the purgative action of the medicine, it should logically be concluded that purified manna is less purgative than flake manna and yet experience does not justify this deduction.

Conclusion.

The Committee is therefore of opinion: 1. That the manna presented to the Academy by M. Dausse, may be employed without inconvenience under the same circumstances as flake manna.

2. That the method announced by M. Dausse not being original, it is not proper to award to this pharmaceutist the approbation which he solicits, inasmuch as it would recognise a discovery where there exists but the simple revival of a method.

3. That acknowledgments should be tendered to M. Dausse for his communication.

Signed *Honoré*, *Caventou* and *Planche*.

Journal de Pharmacie.

ART. X—NEW METHOD OF PREPARING IODIC ACID.

By Lewis Thompson, Esq.

Put one atom or 126 grains of iodine, into a proper bottle, with 24 ounces of water, and pass chlorine previously washed in cold water through the mixture, until it shall have become colourless; set the solution aside for an hour, then heat it to 212° Fah. to disengage the uncombined chlorine, and add $2\frac{1}{2}$ atoms or 295 grains of recently precipitated oxide of silver, boil the whole for ten minutes, filter and evaporate carefully to dryness. The product is pure anhydrous iodic acid.

Mr. Thompson concludes, from the above process, that there is no such acid as the chloriodic, the acid so called being in fact merely a chloride of iodine, which when dissolved is converted into muriatic and iodic acid and a variable quantity of iodine. He has never been able to unite chlorine and iodine in the proportions necessary to form these acids without the intervention of water, and an excess of iodine, but he believes it may be effected in a sufficiently reduced temperature. In one experiment, 50 grains of iodine were combined with 41.5 cubic inches or about 30 grains of chlorine; the substance thus formed, when put into a large quantity of water and exposed for some days to the sunshine, deposited 8 grains of iodine, and became of a pale yellow colour. Mr. Thompson is convinced that the muriatic and iodic acids exist ready formed in the solution, not only from the taste and smell, but because he obtained free muriatic acid from it by distillation, although, when this was continued until the solution became a good deal concentrated, these acids reacted on one another producing chlorine and iodine.

The iodate of ammonia, he states to be a highly crystalline granular powder, possessing but little solubility; it is prepared by saturating the solution of the muriatic and iodic acids with ammonia, when it falls down leaving the muriate in solution. He finds that the iodic acid is decomposed by sulpho-cyanic

acid, and the sulpho-cyanates of potassa and soda, and also that saliva, in consequence probably of the sulpho-cyanate of potassa which it contains, decomposes iodic acid and produces with it and starch a blue precipitate, not distinguishable from that produced under similar circumstances by morphia.

The importance of this discovery, in a medico-legal point of view, is considerable, since iodic acid is now relied on by many as a test for morphia.

Mr. Thompson thinks the above method for preparing iodic acid is cheaper and safer than that of Sir Humphrey Davy, and that it affords a purer acid than that of Gay Lussac. He agrees with Davy in thinking, that Gay Lussac's acid is sulpho-iodic and not iodic acid.—*Ed. Med. and Surg. Journ. From Lond. and Ed. Phil. Mag.*

ART. XI.—EXTRACT OF A LETTER FROM PROFESSOR CHRISTISON OF EDINBURGH TO M. ROBIQUET, ON GAMBOGE AND SCAMMONY.

I propose to send you a long memoir, upon the origin and composition of gummi gutta. I am aided by a most intelligent collaborator, or rather a collaboratress, who is the wife of a Colonel of Ceylon. My colleague, Dr. Graham, and myself have demonstrated that the gummi gutta of Ceylon (which never comes to Europe except to the curious as myself) is identical as regards its composition with the gummi gutta from Siam, which is found in commerce, and that the plant of Ceylon, which Murray of Gottingen declares, from the manuscripts and dried plants of Kœnig, should produce the true gamboge, and which he designates under the name of *Stalagmites gambogioides*, is not a correct deduction, although it be adopted by the Pharmacopœias and Pharmacologists, and that the gamboge of Ceylon is the product of the Garcinia morella of Decandolle, or the Mangostana mo-

rella of Goertner and Lamark, but that this plant presents such characters that botanists will be obliged to establish for it another genus in the natural order Guttiferæ. It is very curious, that the examination of the original specimens of Kœnig whence Murray drew his description, has led to the singular discovery that these specimens are falsified; many important organs being attached to the branches with the gum, in what ever way this has happened, it is what I can affirm.

I have also another memoir almost finished upon the varieties and falsifications of scammony with details upon its composition. I believe that I told you in my last letter that I was occupied with it. Since then I have been enabled to examine more or less than thirty different varieties and I have analyzed eighteen. I believe that the details given by Pharmacologists, of the external characters and the chemical composition of scammony are not applicable to the scammony which is found at present in commerce, probably because the fabricators have changed their mode of preparation in proportion as the sale has increased. One thing certain is that pure scammony is so rare, that even in London, where according to my knowledge the greater part arrives, it was not possible to find a pure specimen during a whole year.

Journ. de Pharm.

ART. XII.—ON THE EFFECTS OF TERRESTRIAL RADIATION ON THE PROCESSES OF VEGETATION; AND SOME ACCOUNT OF THE CHINESE METHOD OF PROPAGATING FRUIT TREES. By J. Murray.

It has been shown that the cooling process of radiation, by which the temperature of the surface of the earth is lowered so considerably, differs materially on the inclination of the hill compared with the bosom of the valley. Mr. Daniell, indeed, states, on one occasion, a difference amounting to 30°: that is to say, the thermometer on the inclined surface maintained a higher temperature by 30° than another placed on the horizontal or level plane of the adjoining valley. This difference is certainly enormous; but it is proved beyond a doubt, that a slope, an inclined plane, for instance, radiates less by many degrees than the surface which is altogother horizontal. Indeed, I think we may collect abundant proof of this important fact among the mountains and the valleys of Italy. On the plains of Piedmont, the vines which are suffered to attain a considerable altitude on lofty poles planted as their support, are detached from these poles towards the approach of winter and prostrated on the earth, where they are secured from injury by the straw.—This treatment protects them from the effects of the intense, though short winter which reigns on the plains of Piedmont; for even at Turin, the water in my room has been congealed into a solid mass of ice throughout its entire extent. The olive succeeds in Tuscany, but the almond, pomegranate, and plants of the Citrus family, flourish but imperfectly; and yet on the acclivities of the amphitheatre of the Appennines, which forms a semicircle round the magnificent city of Genoa, you find that the pomegranate, the lemon, and the orange, mature their fruit and luxuriate. Even the imperial city is indebted for the palm branches to the palms which succeed in the open air at Nice. Now, the only difference in these circumstances consists in a reduction of the loss

sustained by radiation, and the attempered influence of the sea breeze, which more than counterbalance the increase of warmth imparted by the sunbeams to a more southern clime: perhaps even the excellence of Monte Somma wine may have something to do with the acclivity on which the vineyards are planted. To my vision, fruit trees planted on terraces, and rising one above the other in amphitheatrical form appear beautiful; but this has become, I suppose, unfashionable, because it happens to be a gem from the antique. Now, restlessness in search of something new, however absurd, is incessant. The ancients appear, in this respect, to have known what they were about; and I must frankly confess that, in my estimation, they acted wisely, and had the better of us, and that we are decidedly in the rear. To this cause I attribute the remarkable fertility of the land of Judea in former times. Its susceptibility is sufficiently apparent, and there still remain existing vestiges of this mode of cultivating the flanks of the valleys, or the sides of the diversified hills of Palestine, to a considerable altitude. It is still, however, very questionable, whether low walls, constructed of brick, or of stone and mortar, quite vertical, would succeed so well as the surface of a calcarious or sandy soil, at an angle, for example, of 45°. A sandy soil absorbs heat, and continues heated, because sand is an indifferent radiator, and is, moreover, a non-conductor of caloric (heat;) so that vines, &c. in contact with such a surface, would be more than compensated for the temperature they would lose through the medium of radiation; which would also be attenuated from the inclination of the plane.

At St Mary's Isle, the seat of Earl Selkirk, near Kirkcudbright, I remember to have seen a beautiful illustration of my views, in the case of pear trees pinioned to trelliswork in such an inclined surface as I have described; and I have always understood that the crops of fruit which these trees carried were remarkable both for quantity and quality; indeed it must be apparent that under such conditions, spring frosts can have little or no influence, because these frosts are entirely connected

with the principles of radiation, and have little or nothing to do with the temperature of the atmospheric medium. If the soil is not of a sandy consistence, in that case I would employ a thin stratum of sand. I have in my little garden just such a surface, inclined and sandy, and have planted vines with an intention to train them on the surface, on a frame-work, something like cucumbers or melons in a hot-bed. The vine I am making my experiments with, is called Miller's black grape. I have already had ample proof that the healthy luxuriance of other tender plants does not suffer, and that frost has little or no effect on such an exposure.

For the purpose of maturing the fruit, I shall throw a veil of black gauze over the vines; and this will secure me the effects of a powerful absorption of the caloric rays of the sun's beams. Though the radiation from a black surface is proportioned to its absorbent capacity, it will operate during the lengthened day (and at this period of the year the night is reduced to its minimum) in the maturation of the fruit, while the sandy surface is retentive, from its non-conducting character. If bunches of grapes on vines exposed *sub dio*, or reared in the open air, be tied up in white bags, they will scarcely ripen, are small, and want flavour; but if other bunches on the same tree be confined in bags of black crape, the contrast is very striking, in the latter being fully ripe, large, and of a flavour equal to those cultivated on a foreign soil. This fact explains the principle on which I would veil my vines with sable weeds; further explanation would, therefore, be superfluous and unnecessary.

Respecting the Chinese method of propagating fruit trees, it is merely requisite to detach a strip, or narrow ribband, of bark from the branch or limb which is to be separated. The Chinese apply to this a ball of earth mingled with clay, to impart greater consistency to it, and this is covered with moss, and secured by bandages formed of some pliant material; a small pan containing water is suspended over it, and serves to keep the ball moist. This method, as successfully pursued in

this country was first pointed out to me by Sir Lauchlan MacLean, of Sudbury. The Italians often adopt the plan; and I have seen a large orange tree, 14 feet high, loaded with growing fruit, thus separated from the aged parent stock, and exposed for sale in the market at Naples. I have witnessed the plan in full operation near the royal observatory in that city. One obvious advantage is, that no time is lost in the growth of the tree; nay, the very abstraction of the ring of bark from the branch rather expedites than otherwise the evolution of fruit.—The Italians have improved on the rude plan of the Chinese, by enclosing in a tin case the stem of the future independent tree: it is filled with earth, pressed down and covered with moss, which is preserved moist in the way I have already described. This part of it I have improved, by suspending the tin vessel which contains the water on an adjoining branch above the ball, while a woollen thread previously moist, forms a line of communication, and affords a constant regular supply on the principle of the syphon, and the capillary attraction of the fibres of the thread. A lid prevents the loss by evaporation from the surface of the water confined in the vessel.

A linear incision in the bark above a bud, it has been stated, will convert that bud into a branch. Last season I tried several experiments of this kind on a fig, cutting out a narrow strip of bark, over the bud, in the form of an inverted V, and succeeded in producing branches in five out of seven instances. The want of success in these two, I suspect, arose from the imperfect separation of the lips of the bark, and the insufficient depth of the incision.

J. MURRAY.

ART. XIII.—REVIEW OF THE "REPORT FROM THE SELECT COMMITTEE ON MEDICAL EDUCATION, WITH THE MINUTES OF EVIDENCE AND APPENDIX. Part III. Society of Apothecaries, London. Ordered, by the House of Commons to be Printed 13th August 1834."

We have just received the third part of the Report of the Committee of the House of Commons on Medical Education, in reference to the Society of Apothecaries, and hasten to lay an abstract of it before our readers. It consists of two parts, the one containing parole, the other documentary evidence. The former with the exception of the information communicated by Dr. Christison, is characterized by a degree of arrogance, ignorance of subjects on which the most dogmatical assertions are made, inconsistency, prejudice, and inconclusive reasoning, which *a priori*, we should have considered it utterly impossible for any body of tolerably educated professional men in the present day to have exhibited. But this is not all. The evidence, such as it is, discloses facts which imperatively call upon the Legislature to deprive this incorporate body of those exclusive privileges which they have so long enjoyed. These we are aware are grave charges, which it is incumbent upon us to establish by the clearest evidence. But before we conclude this article, we shall convince every impartial reader, in the most unexceptional manner, by the testimony of some of the leading members of

* We have thought the Review, which we now republish from the Edinburgh Medical and Surgical Journal, would be interesting to American readers, as the information it contains is not generally possessed in this country. As regards the direct purpose of the review and its tenor we are not concerned, as the abuses of which it complains are local, and do not affect us. Still, with respect to the practice of the profession in a country so closely connected with us as England, it is important to possess all possible knowledge, and the present article affords the opportunity of becoming acquainted with facts but lately laid before the public.—Ed.

the Worshipful company, not only that these gentlemen are incompetent to direct the medical education of intended practitioners, but that the incorporation has failed to perform its duties, while in others it has made use of its privileges in a manner not only obnoxious but unjust, and utterly in contravention of the spirit of the Act of Parliament, which conferred them.

Before proceeding to this task, it may not be amiss to lay before our readers, some historical information respecting the Apothecaries' Company:

By letters-patent under the great seal of England, dated 9th April, in the fourth year of his reign, James I. ordained, and granted, "that all and singular freemen of the Mystery of Grocers and Apothecaries of the city of London, and their successors for ever thereafter, for the better ordering, governing, and rule of Men of the Mystery of Grocers and Apothecaries of the city of London, and for the profit, commodity, and rule of the good and honest, and for the fear and correction of evil, and deceitful, and wicked, should be and remain one body corporate and politic in substance, deed, and name, by the name of the Wardens and Fellowship of the Mystery and Grocers of the city of London." In the 15th year, however, of the same reign, a separation between the two trades was effected, by his majesty granting a new charter. By this, 122 individuals therein named, and all other persons "brought up, and skilful in the art, faculty, or mystery of an Apothecary, and the same art, faculty, or mystery, at this time existing, and being Freemen of the Mystery of Grocers of the city of London; and with the same jointly and promiscuously, into one body corporate and commonalty, made and constituted, or being freemen of any other arts, faculties, or mysteries, in the city of London, and with the same into one body corporate, society, or commonalty, heretofore made incorporated or constituted," and all their apprentices legally bound, were separated from the Grocers, and formed into a new incorporation, by the name of "*The Master, Wardens,*

and Society of the Art and Mystery of Apothecaries in the City of London." The reasons assigned in this charter, are thus expressed: "For as much as it is signified unto us, on behalf of our well beloved subjects, the Apothecaries of our city of London, and also affirmed and approved unto us, by our well beloved Theodore de Mayerne, and Henry Atkins, Doctors of Physic, our discreet and faithful physicians, that in these latter years, very many empiricks, and unskilful and ignorant men, and unexperienced, do inhabit and abide in our city of London, and the suburbs of the same, which are not well instructed in the art and mystery of Apothecaries, but are therein unskilful and rude, do make and compound many unwholesome, hurtful, deceitful, corrupt, and dangerous medicines, and the same do sell in many parts of this our kingdom of England, and the same do daily transmit, to the abuse and scandal, not only of them which embrace the knowledge of physic, and of the learned physicians of this our realm of England, professing the same, and of our Apothecaries of our city of London, being educated and expert in the same art and mystery, but also to the great peril and daily hazard of the lives of our subjects." From this extract the reader will see that the putting down of quackery, the procuring of pure drugs, and the faithful compounding of physicians' prescriptions, were the objects sought to be attained by the charter now alluded to. By it the society were empowered to purchase and sell lands, to sue and be sued, to have a common seal and hall, to elect a master, wardens and assistants, clerk and beadle, and to sell drugs. The privileges of the college of physicians, and those of the city of London, were expressly reserved, and it was declared "that expert and approved chirurgeons may exercise their art and faculty; and use and enjoy all and singular their proper practice, as much as belongeth and appertaineth to the composition and application of outward salves or medicines only; so that they do not expose, vend, or expose to sale to others, such salves, or medicines, according to the common manner of the Apo-

thecaries of our city of London." The masters, wardens, and assistants for the time being, were invested with the power of making laws and by-laws for the regulation of the corporation and its concerns. In making laws, however, respecting medicines, they were bound to take the advice of the president and censors of the College of Physicians. Freemen of the Grocers' Company, or of any other arts, were prohibited from keeping Apothecaries' shops, as well as all persons who had not served a seven years' apprenticeship to some freeman apothecary, and been examined, and found competent by the master, wardens, and president of the College of Physicians, or such physicians as he shall appoint for the performance of the duty." Extensive powers were also granted them to "enter into any shop or shops, house or houses, cellar or cellars, of any persons whatsoever, using or exercising the art or mystery of Apothecaries, or any part thereof, within the city of London, or within seven miles of the same city, as well within the liberty as without, where any medicines, simple or compound, wares, drugs, receipts, distilled waters, chemical oils, syrups, conserves, electuaries, pills, powders, troches, oils, ointments, emplasters, or any other thing whatsoever, which belong or appertain to the art or mystery of Apothecaries, shall be probable and likely to be found, and to search, survey and prove if the same be, * * and shall be, wholesome, medicinable, meet and fit for the cure, health, and ease of our subjects; and, also * * to try all and singular persons professing, using, or exercising, or which hereafter shall profess, use, or exercise, the art or mystery of Apothecaries, or any part thereof, within the aforesaid city of London, the liberties or suburbs thereof, or within seven miles of the same city, as well within liberties, as without, touching or concerning their, and every of their knowledge, skill or understanding, in the aforesaid art and mystery of Apothecaries, and to remove and prohibit all those from the exercise, use, or practice, of the aforesaid art or mystery, whom hereafter they shall find unskilful, ignorant, or insufficient, or obstinate, or repugnant to

be examined, by virtue of these presents in the art and mystery aforesaid." They were also authorized to "burn before the offender's door, all medicines or drugs which they should find unlawful, deceitful, inveterate, out of use, unwholesome, corrupt, unmedicinable, pernicious, or hurtful, and to lay, impose and execute punishments, and other pains and penalties, by fines and amerciaments upon such offenders according to their sound discretions, and the ordinances by them and their successors, so as aforesaid, to be made and appointed."

It is evident from the abstract which we have given, that as we have already stated, the sole object in granting the charter, was to secure a supply of pure medicinal substances, and the due and faithful compounding of them according to the formularies or prescriptions of physicians, and that the apothecary derived no title whatever from it to practise either medicine, surgery, or midwifery. The apothecary was a mere appendage to, or servant of the physician, and many of them, in olden times, had actually acted in this capacity, and derived all their knowledge from the casual instructions of their masters. But, besides compounding medicines, the apothecary—in many cases—was called upon to administer them, or see them administered, and in this manner picked up a smattering of knowledge, which made him useful in trifling cases, or when a physician could not be procured, much in the same manner as a client will, in the absence of his legal adviser, frequently consult his clerk. This usurpation met with some opposition on the part of the physicians, but being sanctioned by the community, was persisted in by the apothecaries, whose increased importance was evinced by the acts of Parliament, passed to exempt them from serving offices.

In what manner the society fulfilled its duties within the bounds of its jurisdiction, we have no means of knowing accurately.—But it may be safely inferred from the number of complaints which were made, that they were inefficiently performed. It will be observed, that the charter gave the society no power beyond London and seven miles round,

and thus, though throughout the country the lieges were left to the mercy of any unprincipled and ignorant man who chose to designate himself by the title of Apothecary, or Surgeon, or Surgeon Apothecary, as suited his fancy, the society had no means of putting an end to this evil; and an association was formed for the purpose both of protecting the public, and elevating the statutes of the society. The following extracts from the evidence of Dr. Burrows, exhibit the true state of the great body of the profession at that period, and the objects of the association.

"239. What was the state of the medical profession, as regarded general practitioners, before the act of 1815? There was a great number of individuals practising as general practitioners, who had certainly not received a competent education, and therefore were not acting in a manner creditable to themselves, or beneficial to the public."

"240. You acted as chairman to the General Association of Apothecaries, and Surgeon Apothecaries of England and Wales? I did."

"241. Did you principally conduct the correspondence of that Association, with the practitioners of England and Wales? Wholly; there was a secretary, but I conducted the whole of it."

"242. Was the act of 1815 occasioned by the proceedings of that association? Unquestionably."

"243. What were the evils to remedy which the Association was formed? I have extracted the principal grounds: First, that persons were allowed to practise as surgeons, as apothecaries, and as midwives, to dispense medicines and to compound prescriptions in England and Wales, who had never received any education to fit them to exercise those functions, whereby the public were much injured, and the character of the medical profession was lowered."

"244. Their principal object was to reduce the number of those who were practising without having received any medical education at all? Surely, not only to reduce their number, but to prevent them from practising altogether.

The second complaint was, that there was no superintending power to examine into the qualifications of the persons entering upon those several branches of the profession; that in consequence of this lowering of the character of the general practitioner, it was exceedingly difficult to procure apprentices; that as the general practitioner had no legal right to charge for his attendance on the sick, he was compelled to resort to an expedient for remunerating himself, exceedingly revolting to the feelings of a liberal mind; that a most cruel system of farming the medical attendance upon the parochial poor to the lowest bidder, without any regard to the proper qualifications of the party tendering, had become general. These were the five particular points that the practitioners pressed upon the attention of the association."

The Association began to meet in 1812, and in December of that year, petitioned parliament. In March, 1813, a bill was introduced into the House of Commons, but, after being read a first time, it was withdrawn, in consequence of the opposition offered to it, principally, as would appear, by the Colleges of Physicians and Surgeons. The Society of Apothecaries professed to act according to the instructions which might be given to them by the College of Physicians, but remained to a certain degree neutral. In the following year, the bill was again brought in, and several clauses introduced into it, of which the members of the association did not approve, but to which, finding that they could do no better, they were obliged to consent. The opposition of the colleges seemed to be withdrawn at the intercession of Mr. George Rose, as it was through him that it was communicated to the association, that they had agreed to the framing and introduction of a bill, and he became the organ of communication between the parties. Nine-tenths of the members of the association were surgeons, and some of them belonged to the Society of Apothecaries. In 1815, a bill was passed, which has given rise to so many just complaints, both as to its provisions, and as to the manner in which it has been carried into effect, and which it seems to have been the determination

of the witnesses whose evidence we shall presently examine, to exhibit as being perfect in both.

This act (55 Geo. III. cap. cxciv.) confirmed the whole of the charter of James, except in so far as it repealed that portion which directs the master, wardens, &c. to examine the shops of apothecaries, examine medicine, and impose penalties, and substituted for it a power to enter the shops of every apothecary in England and Wales, at any time during the day, to test the various drugs or medicinal substances found therein, to destroy such as they should find to be "false, unlawful, deceitful, stale, unwholesome, corrupt, pernicious, or hurtful," and to impose penalties upon offenders; "for the first offence, the sum of five pounds; for the second offence, the sum of twenty pounds; and for the third, and every other offence, the sum of twenty pounds." Additional powers were also granted and duties imposed. Section fifth, which some of the members of the Apothecaries' Company make a boast of violating, enacts "That if any person using or exercising the art and mystery of an apothecary, shall at any time knowingly, wilfully, and contumaciously, refuse to make, mix, compound, prepare, give, supply, or administer, or any way to sell, set on sale, put forth, or put to sale, to any person, or persons whatever, any medicines, compound medicines, or medicinable compositions, as directed by any prescription, order, or receipt, signed with the initials in his own hand writing" of any physician licensed to practise physic by the Royal College of Physicians of London, or either of the Universities of Oxford, or Cambridge, the offender, on complaint being made by the physician within twenty-one days, shall, unless he can show a justifiable reason, on conviction before any justice of peace, "forfeit his certificate, and be rendered incapable in future of using or exercising the art and mystery of an apothecary, and be liable to the penalty inflicted by this act, upon all who practise as such without a certificate, in the same manner as if such party so convicted, had never been furnished with a certificate, enabling him to practise as an apothecary; and such offender, so deprived of his certificate, shall

be rendered and deemed incapable in future of receiving and holding any fresh certificate, unless the said party, so applying for a renewal of his certificate, shall faithfully promise and undertake and give good and sufficient security that he will not in future be guilty of the like offence."

Sections XIV. and XV. enacted, "that from and after the first day of August, 1815, it shall not be lawful for any person or persons (except persons already in practice as such,) to practise as an apothecary in any part of England or Wales, unless he or they shall have been examined by the court of Examiners, or the major part of them, and have received a certificate of his or their being duly qualified to practise as such, from the said Court of Examiners, or the major part of them as aforesaid, who are hereby authorized and required, to examine all persons in the science and practice of medicine, and his or their fitness and qualification to practise as an apothecary, * * * provided always, that no person shall be admitted to such examination, until he shall have attained the full age of twenty-two years. Provided always, * * * That no person shall be admitted to any such examination for a certificate to practise as an apothecary, unless he shall have served an apprenticeship of not less than five years to an apothecary, and unless he shall produce testimonials to the satisfaction of the said Court of Examiners, of a sufficient medical education, and of a good moral conduct."

The act also provides for the appointment of a Court of Examiners, to act under an oath, specifies the qualifications necessary to render a man eligible to be appointed an examiner of drugs or candidates, and the manner in which all regulations shall be made, enacts penalties, points the application of these, and fees received on examination, and limits actions to six calendar months after the offence, &c. Chemists and druggists are excepted from the operation of the act, and the rights and privileges of the Universities of Oxford and Cambridge, the Royal College of Physicians, and Royal College of Surgeons are preserved to them.

This obnoxious act differs from the charter in nothing save

the granting of additional powers to a body which had failed in performing its duties, and which so far from being prepared to give effect to its provisions seemed to be overwhelmed with the trusts and privileges committed to it. Clear proof of this is found in the testimony of Dr. Burrows, who was the principal agent of the association to which the Society of Apothecaries is indebted for the act. He was asked, if between the passing of the act and his retirement from the Board of Examiners, the Society of Apothecaries were disposed to act in carrying the statute into effect, in a manner conducive to the public interest? and his reply is "undoubtedly so; generally speaking, most decidedly. It required some little trouble to convince them of the course they ought to pursue. In fact, it seemed to come upon them by surprise. For although they had solicited the bill, yet they had not prepared their minds for the extensive privileges which that act gave them, nor for the great benefit which might accrue to the public by carrying the act into effect." He then states that the greater part did not know the important duties and powers that had devolved upon them. In a subsequent examination, he affirms that "the members of the Court of Examiners differed extremely in their interpretation of the act and that he thought that many of them had not sufficiently prepared themselves to administer a statute which was so important and gave such extensive privileges. They had obtained the act, but did not understand the spirit of it." He, however, asserts that "they have carried the act into effect in the most material matters, in a manner which has been most highly conducive to the benefit of the members of the profession, and to the benefit of the public." How far this statement is well founded, we shall have an opportunity of showing in the course of this article. In the mean time we proceed with our introductory remarks.

We have already stated, that an apothecary at first was nothing more than the name really implies, an individual who kept a supply of medicines and compounded them as directed. The above mentioned act in reality made him superior to a

physician, inasmuch as it not only conferred the privilege of practising, but also of compounding and dispensing medicine, which no graduate of a University, save Oxford and Cambridge is permitted to do, unless a fellow or licentiate of the Royal College of Physicians of London, in which case the provision is nugatory, as this body prevents its members from acting as general practitioners and dispensing medicines. Mr. Nussey, indeed, states in his evidence that it was decided in the reign of Queen Anne, in the case of the College of Physicians, against an individual of the name of Rose, that an apothecary was competent to ascertain the nature of a disease and to treat it, and that he can refer to some proof of that; into which, however, he does not enter. In answer to the question, whether this decision goes so far as to define what an apothecary is now? he says "at the present moment, there are very few individuals practising pharmacy exclusively, perhaps not more than half a dozen, in the whole town. But the apothecary strictly is still an individual who simply attends the sick and treats disease." The examination then proceeds. "Is he a person who attends an individual affected with some internal disease, not requiring external or manual aid, who prescribes for the cure of such complaint and supplies the medicine? He is. The supplying of medicine is an essential part of it? That is as it may happen. In my situation in life, I am sometimes called upon to prescribe; to give my opinions without sending medicine. You are not the only instance of that? I speak of myself, there are others. What is the definition of an apothecary as distinguished from other practitioners? That which the chairman has already stated, is the meaning I apprehend of the word apothecary."

So then, the apothecary, according to Mr. Nussey, the chairman of the Apothecaries' Company, acts in many respects as a physician. *He treats any internal disease not requiring external or manual aid.* Now this will evidently prevent him from treating the greater number of inflammatory complaints, in fact all complaints which require blood-letting in any form. Definitions, as Dr. Johnson long ago remarked, are hazard-

ous; and, in the present case, Mr. Nussey, in endeavouring to aggrandize the apothecary, has precluded him from treating many of those diseases in which the aid of the general practitioner is most frequently required. The apothecaries, however, do not confine themselves within the narrow limits, prescribed for them by their chairman. They engage in the practice of midwifery, and that nothwithstanding it is declared by one of the Court of Examiners, that the delivery of a woman is considered a surgical operation, and according to the opinion of counsel, they have no power to examine a candidate for their license, on his obstetrical knowledge.

By another member of the Court, Mr. J. Bacot, it is admitted that although it is necessary that every general practitioner should be well instructed in surgery, many apothecaries are quite ignorant in this respect. Thus a licentiate of the Apothecaries' Company may practise Midwifery and Surgery, without having his qualification to do so tested by any board. It is true, the witnesses seem to regret this state of matters, but it does not appear that any very active steps have been taken to obviate the evil. It may be urged by way of palliation, that most of these licentiates pass the College of Surgeons, but there is no power to force them to do so, and this at all events would be no guarantee that they are possessed of any knowledge or skill in Midwifery. They seem to have been quite content to leave matters as they were; satisfied that their licentiates possessed a monopoly of general practice. From their not asking power to examine the candidates for their license on Surgery and Midwifery, it would appear that they conceived less mischief to be likely to result from an ignorant individual treating a case of strangulated hernia, or retention of urine, or managing a delicate woman in the most critical situation of her life, than in failing to give an ointment its proper consistence, or a draught an agreeable colour and flavour. With them, a knowledge of pharmacy and the external characters of drugs would appear to be the most important to be required; but the reader will find in a subsequent part of the present article, that these patrons of phar-

macy are ignorant of some approved processes in pharmacy; and that even the examiners themselves are glad of the assistance of their chemical operator, in answering some questions on the subject put by a non-professional gentleman.

Before concluding these preliminary remarks, it may not be unnecessary to state, that the apothecaries of England consit of two distinct classes of individuals, the Licentiates and Members. The former have no share, either in the management of the funds of the corporation, or in the election of office-bearers, the regulation of the course of study, or the execution of the act of 1815. We wish it to be understood that in this article our remarks have no reference to these individuals.

The privileges of the members of the incorporation may be thus briefly stated: 1st, The Master, Wardens, Examiners and Treasurer are chosen from among them: 2nd, Their apprentices have the advantage of attending lectures upon Materia Medica and Botany, and during six months of the year of going into the country, in company with a demonstrator appointed to instruct them in botany, refreshments being allowed them at their first two meetings. At the end of their apprenticeship they may enter the incorporation free of expense, while others, must pay a fine of one hundred pounds sterling. This last privilege, however, seems not to be worth £100, inasmuch as no one had entered the incorporation by redemption, for seven years previous to March 1834: 3rd, The Master, Wardens, Examiners, &c. have the power of regulating the affairs of the society, and the course of study to be pursued by candidates for their license. To them also is committed the carrying into effect the other provisions of the act of 1815.

Our readers will now be in a condition to examine with us the evidence adduced by different members of the society of Apothecaries, who have come forward to communicate information to the Committee of the House of Commons, respecting medical education, and other matters connected with the profession. In the remainder of this article, then, we shall consider, *first*, how the public duties entrusted to the Society of

Apothecaries have been fulfilled. *Secondly*, the suggestions offered by the witnesses respecting medical education. *Thirdly*, we shall examine those charges and insinuations which have been made against the Edinburgh School, and in conclusion, we shall show that we had good grounds for making those assertions regarding the incorporation, and several of its influential members, which we felt it our duty to do at the commencement.

I. *In what manner has the Society of Apothecaries exercised those privileges and fulfilled those duties which were entrusted to it by the charter of James* I. *and the act of* 1815? The duties of the society may be classed under four heads. 1. To examine the medicinal articles kept by apothecaries. 2. To prosecute unqualified practitioners. 3. To prescribe the course of education to be followed by all those intending to apply for a license. 4. To examine all candidates. 5. To keep at the Hall a supply of pure articles used by apothecaries. We shall now inquire how each of those duties have been fulfilled.

Examination of Apothecaries' shops. The following extracts will show how this is conducted. "How is the visitation of apothecaries' shops by the wardens of your society, in company with the censors of the College of Physicians, conducted? The physicians call upon the Society of Apothecaries twice a year, I think it is, to send their wardens to assist them in the examination of the shops. Is the day fixed? The day is fixed; it is in the summer and the autumn of the year. Is it pretty well known before hand on what day the visit will take place? Yes, it is, but there has been some alteration made lately; one of the examinations is postponed to a later period of the year; they were very nearly together. About what period of the year is it? I think it is this very month, (June.) In short, both have taken place in this very month, but upon the last examination it was thought better to postpone the second examination till towards the end of the year. How many shops are generally visited in a day? I dare say from forty to fifty. I was on these examinations

last year twice. How many were visited in a day on that occasion? I should think, between forty and fifty. Do you keep a record of the names of the shops visited? The beadle of the College accompanies the deputation and takes the name of the individual keeping the shop, and minutes any observations that are made by those who examine, and on the appearance of the drugs. And that book is kept? Yes, I suppose so; but it is in the keeping of the College of Physicians. At what hour of the day does the visitation commence its proceedings? I think somewhere about one o'clock. And when does it end? It ends about six. How long, upon an average, does the visitation of each shop last? Perhaps a quarter of an hour;—not so much. Besides the visitations of the shops of apothecaries and druggists, which the officers of your society make in company with the censors of the College of Physicians, do they, sole and unaccompanied by the censors, make any similar visitations, by virtue of the authority granted to them by the act of 1815? Yes, we are bound by the charter, as well as the act of Parliament of 1815, to visit apothecaries' shops, but not those of druggists; we have no power over druggists. Are you, sole and unaccompanied by the censors of the College of Physicians, in the habit of visiting apothecaries' shops? Certainly. Upon what officer does that duty devolve? It devolves upon the Court of Assistants, or if necessary, upon some men of the livery of the society. A power is invested in the master of the society to appoint and direct certain individuals to undertake this office. Is a search by the members of your society, so appointed, constantly going on, or is it only on extraordinary occasions that it is directed to be made? For a great many years a search was made every year, but lately it has been but once in two years. But one day, once in two years? One day, or more than one day, depending entirely upon the district they visit, and upon the number of visits they have to make. We have now and then gone thirty miles from London, and that cannot be accomplished in one day. Do they now by virtue of these powers, make visitations all over England and Wales?

They do not and never have done so. Have they not the power by virtue of the act of 1815? They have; they have the power of appointing searchers in the country. You have stated that they do not visit druggist's shops. Unattended by the censors of the College of Physicians have you any power to visit these shops—attended by the censors you do visit them? Yes we do. Your search in company with the censors is confined to the city of London? Yes. Is visiting twice a year, effectual in preventing, within the precints of the city of London, the sale of bad or spurious medicines? My opinion upon that subject is this, that it is not by any means so efficient and complete a law as is desirable, that there are many ways and means of passing off adulterated medicines, which no search can prevent. I do not see how it is possible to prevent it. No search you say can prevent it? It is not, therefore, to the imperfection of the present law of search, but to the principle of the law of search in general that you object? I think I may state, with regard to the present race of general practitioners, that for the most part they are men of such standing and acquirements as scarcely to be supposed capable of fraud. The question refers to the use of visitations, of such especially as are made in the city of London, by your wardens and the censors of the College of Physicians. No search, you say, can prevent the sale of adulterated medicine on the part of those who are disposed to sell it? I think not. I think it fails in accomplishing that purpose; that it may do some good is possible,—but there are plenty of opportunities for frauds, if people are disposed to commit them, in spite of searchers. Is not the search in question less efficient than it might otherwise be, owing to its being made on two days only in the year, and those days occurring at fixed periods, so that all parties whom it may concern are duly apprized before-hand when they may expect a visit? Yes, I think so. The mode, therefore, of conducting the search renders it still more ineffectual, than even, if well conducted, it still must be? I think so. As the search that is made by your

society of all the apothecaries' shops in England and Wales, takes place but once a year, (we are told that this search never took place,) is not that still less efficacious than the search that you made together with the physicians? Yes, I must admit that. Are your visitors provided with tests, or any other means of making extemporary trial of the purity of any articles in the Materia Medica? Some few tests that apply to specific medicines; poisonous medicines, for example, and medicines of specific virtues. Does the search,—either that which you make singly, or that which you make in company with the physicians,—afford to the public any reasonable degree of security against the sale of bad or spurious medicines? I think not, if the disposition existed to sell such medicines." —*Evidence of John Nussey, Esq.* pp. 38. 68.

In this case we find a most important duty in some cases altogether neglected and within a limited district performed in a most careless and inefficient manner. Mr. Nussey makes an attempt to palliate this negligence by stating, *first*, that the law is inefficient; *secondly*, that it is useless and would be so in any case, in consequence of its being impossible to convict the guilty; and *thirdly*, that the general practitioners are of such standing and acquirements, as to place them above suspicion. He is then forced to assert that such searches do some little good, even when conducted on the present absurd plan, and that more good would be effected if the search were to be more effectual. Last of all, to revert to his first stated opinion that the search does not give the public any reasonable degree of security against the sale of bad or spurious medicines, omitting all consideration of these contradictory opinions, unbecoming the head of a society invested with so extensive powers, we cannot see upon what principle the incorporation are justified in not fulfilling a duty positively imposed upon them by law; or if they possess a dispensing power, upon what principle they refuse to exercise it in other cases where it would be attended with positive advantage to the community.

We are unwillingly forced to conclude, that had the apprenticeship clause entailed on the incorporation as much trouble and as little profit as that which directs them to search Apothecaries' shops, we should have seen it fall into desuetude, and have been favoured with many very cogent reasons, or at least ingenious reasons for its being allowed to do so. We cannot pass over this part of the evidence without calling the attention of the reader to the doubt and ignorance, either real or affected, displayed by the Master of the Apothecaries' Company, in respect to matters on which no one could possibly suspect that there could be the smallest hesitation in the representative of the Society. He speaks with hesitation of the number of times in the year the physicians examine the drugs of venders of medicine, and in answer to the next questions, states positively that the search is made twice, and that the seasons are summer and autumn. He next discovers that they both take place in June, and so on.

Now if there was a single point on which the Master of the Apothecaries' Company could convey information, we would have thought that it would be in regard to its powers and privileges. We shall see, however, hereafter, that his knowledge of such points is accurate and extensive, compared with that displayed by him regarding others, and that he knows, perhaps, less of the educational course of the Edinburgh College of Surgeons, than a first year's Edinburgh student, of the qualifications necessary for him to possess before he presents himself before the Examiners of the Worshipful Company.

It is unnecessary for us to quote other evidence to convince our readers that the Society of Apothecaries have failed in the performance of a duty, the due fulfilment of which, is of the utmost importance to the community. We cannot see how it is at all more difficult to detect spurious medicine, and bring the guilty to punishment, than it is to discover when porter or ale has been adulterated. But the difficulty of performance will not excuse its not being done at all. We are told that a visit to a shop lasts less than a quarter of an

hour; but granting that the search lasted fifteen minutes, we contend that it is utterly impossible to have ascertained even by the label, the contents of each bottle and drawer in a shop of the smallest dimensions, much less to have removed the stoppers and opened the drawers. It would appear from Mr. Nussey, that they carry some few tests applicable to specific medicines, and the instance which he gives of specific medicines is poisonous medicines, and medicines of specific virtues. It becomes absolutely ridiculous to see language so loose and unscientific made use of by the representative of a society, the office bearers of which arrogate to themselves the merit of being the only board which ascertains effectually the knowledge possessed by a candidate of pharmacy, materia medica, and practice of physic. Verily, we are not astonished, that so many who have been educated at the northern schools, have been rejected by the learned Society of Apothecaries. For ignorant persons with authority on their side and want of intellect in their heads, it is easy to reject those who are better informed. But enough of this for the present. We shall return to the subject in the course of the present article.

(*To be Continued.*)

ART. XV.—POISONING BY ARSENIC EMPLOYED EXTERNALLY.

THE Archives Generale de Medicine, in the number for June 1836, report (from the Medicinische Annalen von Puchelt, Chalius und Nargele To. 1—N. 3) the following observation of Dr. Kuchler:

The wife of a waterman, aged 68 years, had been for six years the subject of a bronchitic affection with viscid mucous expectoration which affected her health, without, however, hindering her from pursuing her occupations. Within the last seven or eight years, there had developed itself about the centre of the right temple, a pustule which, from continual irritation, degenerated into a fungous tumor; its growth was so rapid, that two years ago she applied for relief. The action of caustic caused it to diminish considerably; but finally it acquired double its original volume; and discharged when compressed a considerable quantity of blood and pus. The strength of the patient, her embonpoint, her sleep and appetite diminished to an alarming degree. Dr. Kuchler was consulted in November 1834. The diameter of the tumor was 30 lines, its prominence was only 2 lines and a half, its consistence soft, analogous to that of a cauliflower, with irregular edges turned inwards, and at some points embossed; the tumor was not painful except when there was a change of temperature. When touched there was a discharge of blood and pus. It was moveable without adherence, it extended from the external margin of the eye to the ear. The surrounding parts were in good condition.

After having successfully combatted the cough, the dyspnœa and the expectoration, Dr. Kuchler employed to the tumor lotions of corrosive sublimate, which diminished the purulent and sanguineous discharge. But being desirous of effecting a complete cure, he had recourse on the 19th of November to the arsenical powder of "frere Gomé." He did

not employ more than $\frac{4}{5}$ of the quantity resulting from the following formula:

℞	Red sulphuret of mercury	gr. ij.
	White oxide of arsenic	ʒ ij.
	Dragon's blood	12 gr.
	Animal charcoal	8 gr.

This powder was mixed with a little water to form a pap, which was spread over the tumor; perceiving that transparent lymph oozed from all the openings, the Doctor applied to them the preceding powder. The layer of paste was about a line in thickness. The diseased surface was left exposed to the atmosphere without any other dressing. Six hours afterwards reaction commenced; on the 21st in the evening, the inflammation had attained its maximum of intensity, the redness, during the extension of which the patient had suffered very great pain, had now taken possession of half the face and the eye of the opposite side.

The integuments of the cranium had however suffered very little, and the general condition of the patient appeared sufficiently satisfactory. An emulsion was nevertheless prescribed with cherry laurel water. But in proportion as the redness disappeared, an inexpressible uneasiness, extreme anxiety and so much dyspnœa supervened, that the patient could not respire but in the upright position and by forcibly bringing into action all the muscles of the thorax. She laboured under a sense of constriction about the præcordial region, her tongue was covered with thick fur, with intense thirst; sharp colicy pains were experienced with desire to go to stool, followed by a discharge of pus without any fecal matter.

To treat these horrible symptoms, Dr Kuchler exhibited fifty grains of ipecacuanha in the space of an hour and a half; some vomiting of bile, mucus and gastric juice followed, brought up with great effort. The violent symptoms continued to augment, the patient was delirious if she slept, and salivated continually, the root of her tongue was painful and swollen, in consequence of which deglutition was difficult, the extremities were inclined to become cold, a cold sweat covered her

forehead. On the 22d in the evening, an emulsion was prescribed consisting of Castor oil and manna; to reduce the swelling of the tongue, four leeches were applied to it. The next day the tongue was hot, so intensely red and so swollen that deglutition was almost impossible; several half fluid stools occurring during the day appeared to produce some diminution of the constriction and of the symptoms occasioned by the tumefaction of the tongue; the extremities regained a little warmth; but very soon after the dyspnœa became extreme, the pulse almost imperceptible, the forehead and extremities cold, the lips bluish, and the mucous rale announced that death was near at hand, when the patient could just state in a feeble voice that this alarming change had come on half an hour before. She died 96 hours after the application of the arsenical paste. 24 hours after death, the body was cold, bloated, and the whole of the posterior portion of the body coloured bluish. The friends opposed an autopsy.

Dr. Kuchler did not doubt that the patient had died from poisoning, the symptoms of which are undeniable, from the constriction of the heart, the anxiety, the palpitations, the dyspnœa, the thirst, the salivation, the swelling of the tongue, the difficulty of deglutition, the colic, the tenesmus: he thinks that from the softness of the tumor, the exudation from it having rendered liquid the arsenical paste, this after having acted upon the diseased parts, came in contact with the healthy parts, by which it was absorbed, the absorption being favoured by the general condition of the patient.

The author deduces from this case the following practical conclusions.

1. That the use of arsenic is contra-indicated when the part is soft and not indurated.

2. That the least active arsenical preparations are dangerous in cases of this kind, and that it is better to use the paste of corrosive sublimate, according to the method of Græfe.

3. That some hesitation should exist as to the employment of arsenic, even in cases of true scirrhous, lardaceous, fibrous,

and cartilaginous indurations, if the ganglionic system at the same time is brought into sympathy.

4. Dr. Kuchler is of opinion, that when arsenic is employed, those forms of preparation should be selected which are now in use among the most skilful surgeons.

N. B.—It would be useless to remind our readers that this is not the first time, that accidents have occurred in consequence of the use of the arsenical paste. We may also remark that the employment of corrosive sublimate is also not without risk. Of this the following case is a proof:—

A child 6 years old, labouring under bronchitis, of lymphatic constitution, hair thin and flaxen, had been often affected with vermin of the head. As is my practice, under similar circumstances and never previously with any inconvenience, I prescribed a powder of 6 grs. of calomel and two drachms of anise, to be sprinkled over the head and then covered with a night-cap. This was during the warm weather of June. Two hours after the application, the child experienced violent pain in the head, the scalp became red and tumefied, and frequent vomiting ensued. The head was washed carefully, and allowed to remain uncovered as before, a cataplasm was applied to the abdomen, and as every species of drink was rejected, even cold sugared water, several hours were allowed to pass without allowing any fluid to be swallowed, injections of starch were administered every five or six hours. The vomiting soon ceased completely, the intense fever, and the great heat which had accompanied the vomiting subsided, the child was gradually put upon the use of gum-water, at the commencement given by the tea spoonful hourly. Was not the deuto-chloride of mercury employed instead of the proto-chloride?

One thing alone could have favoured the action of the proto-chloride; it is, that upon the day that the powder was employed, three scabs from a papulous eruption which had developed itself upon the head, had been removed, over these places, scarcely three lines in diameter, the cutis was left bare;

this effect was, however, so little apparent, that upon the same evening the places had dried up.

We have already cited in our Journal so great a number of analogous facts, that it is not necessary to state here, that these extraordinary effects, in other respects rare, are the consequences of some individual predisposition, which will be met with by even the most careful practitioners.

ART. XVI.—REPORT MADE TO THE SOCIETY OF MEDICAL CHEMISTRY UPON A NOTE ADDRESSED TO IT BY M. GUYOT, A PHARMACEUTIST OF PARIS, ENTITLED "OF THE DECOMPOSITION OF ESSENTIAL OILS BY IODINE."

Gentlemen:

M. Guyot, in the note addressed to you, has examined with more care than has hitherto been done, the action of iodine, both with and without heat, upon certain essential oils. He has discovered that many of them, as for instance, the oils of lemon, turpentine, naptha, and juniper, react violently and instantaneously when brought in contact with iodine at the ordinary temperature, and that others, on the contrary, produce a reaction at the end of a period more or less prolonged; in this second category are placed the oils of mint, sage, lavender, absinthium, &c. &c.

Upon distilling the solutions of iodine in the essential oils of turpentine and savin, M. Guyot has observed that from the first impression of heat throughout the whole time of the operation a vivid reaction goes on, with a very abundant disengagement of hydriodic gas, and that finally, there remains in the retort an abundant residuum of carbon.

The formation of so large a quantity of hydriodic acid has

led the author to make use of this acid in the preparation of the iodurets of potassium and sodium, and of the hydriodate of ammonia, by passing through the alkaline solutions the product of the reaction between the vapours of iodine and the oil of turpentine.—The apparatus which M. Guyot has employed, and which permits, according to his account, of saturating some ounces of concentrated alkaline solution with a small quantity of iodine, consists in bringing together in a globe with three tubulures, from one side the vapour of the oil of turpentine, and from the other the vapour of iodine, and then conducting the product of the reaction through an alkaline solution, by means of the third tubulure.

Although it is very likely, that iodine, in its reaction with the essential oils, does not solely unite with their hydrogen and liberate their carbon, we think that the society, in thanking M. Guyot for his interesting communication, ought to request him to examine some other products which he has observed in the course of his experiments, in order to complete the work which he has commenced; as for instance the *spirit of balsamic resin*, which he has noticed in the product of the distillation, and a *white flocculose matter* which is separated with the ioduret of potassium by saturating the hydriodic gas obtained in this way. A new examination of these products, as well as their elementary analysis, may perhaps demonstrate that the iodine in its reaction with the essential oils, is substituted for the hydrogen to form new combinations, as has already been observed to be the case with chlorine, in certain organic compounds.

While expecting that M. Guyot will publish some new experiments which we would desire him to make, we recommend the society to insert in its Journal, the note addressed to it by this pharmaceutist.

Lassaigne. Journal de Chemie. Med.

MISCELLANY.

Composition of Asses milk.—By M. PELIGOT.—The author has endeavoured to determine if chemistry is not capable of furnishing some data upon the composition of Asses milk, which will explain the reason why it has been preferred by practitioners. His conclusions are the following:

1. That this milk differs essentially from others by the greater proportion of sugar of milk, a proportion which is increased upon an average to 6.29 for .070. M. Peligot has moreover examined the influence of food upon the quality of the milk. Finally he has stated, contrary to the opinion generally received, that the milk obtained from a second milking, is rich in solid matters, in proportion to the shortness of the interval between it and the first, and that from the same milking, the amount of solid matter increases from the portion first drawn to the last.

Journal de Pharmacie.

Sugar of mushrooms.—Three very distinct species of sugar have been admitted; but at the same time one of these species has been very little studied, viz. the sugar of mushrooms. M. A. Bussy has made the analysis of very pure and crystalline sugars from cantharellus merulius and clavaria coralloides, and has found that these substances were nothing else than mannite, the properties of which they moreover possess. M. Malagutti on his own part, had arrived some time since at the same conclusions, relatively to the sugary substance obtained from another species of mushroom, but the little amount which he had with which to manipulate, did not allow him to draw any definite result from his experiments.

A specimen of sugar obtained from ergot of rye, which has been regarded by some naturalists as a species of fungus, in an equal degree exhibited the properties and composition of mannite.

Journal de Pharmacie.

Oil of the cherry laurel.—Chlorine in solution by acting upon the oil of bitter almonds, produces a shining neutral crystalline substance, which may be considered as formed of an atom of benzoic acid and two atoms of hydroguret of benzoic. We have witnessed the oil of cherry laurel acted upon in the same manner, and obtained a compound similar to the crystalline substance which is furnished under the same circumstances.

Adulteration of iodine.—Stieren has detected several adulterations of iodine by dissolving the latter in spirit. The impurity remains undissolved, consisting sometimes of iron, silica and alumina, at other times of iron containing carbonaceous matter. Buchner has found glance coal.

Buchner's Report and Records of General Science.

Morphia in native green poppy heads.—According to Du Menil, morphia exists in common poppy heads, but in small quantity. He evaporated the expressed juice of the poppy head in a water bath to the consistence of honey, exhausted the residue with spirit of 80 per cent., slightly rendered acid by sulphuric acid, distilled the greenish solution, added water to it, filtered it, neutralized the solution with ammonia, although not completely, precipitated it by a solution of galls, collected the precipitate, washed it, digested it with lime water, dried the mixture in a water bath, pulverized it, digested it with spirit and distilled. The residual solution left behind a small quantity of a resinous matter (3 lbs. poppy heads gave ½ gr.) which tasted somewhat bitter, and was coloured scarlet by concentrated nitric acid, and blueish by chloride of iron.

Records of General Science from Central-Blatt.

Cochineal of Ararat.—In that part of Armenia which is now incorporated with the Russian empire, in the province of Erivan, and in the vallies of Araxes, a species of cochineal insect is found, which, according to M. Hamel, appears to be unknown to naturalists. It is met with principally in the villages of Schorly, Sarwanlar, Nedscely, Hassan, Abad, &c. M. Hamel, by giving a view of the different authorities who have mentioned it, shows that it enjoyed an important rank in commerce until the period when the American cochineal shut it out of the market. It is very distinct from the cochineal of Poland. A pound of Armenian cochineal contains only from 18 to 23 thousand insects, while that of Mexico contains 20 to 25 thousand, and that of Poland 100 to 130 thousand. It contains also more colouring matter in an equal weight than the Polish. It is found abundantly on the roots of the Ærolupus lævis (Trinius), a plant which grows abundantly in Erivan. Brandt proposes to call it Porphyrophora Hamelii. *Records of Gen. Science.*

Inferiority of English to China Ink.—The directors of the Bengal bank lately refused payment for a number of bank notes, in consequence of their containing no signature. It appeared that they belonged to a Hindoo, who had kept them in a copper box. He asserted that they originally possessed the signatures of the director, comptroller, cashier, &c. but that they had been effaced. The notes on which the signatures had been written with China ink remained uneffaced, but all the writing with English ink had completely disappeared. Mr. Princes sin order to determine

the question, placed a paper covered with writing in English ink between two plates of copper. After a short space of time he found that the copper had decomposed the ink, and that the writing was completely effaced. He concluded that the account of the Hindoo was correct; and that the bank ought not to refuse payment.

Asiat. Soc. Journ. and Rec. of Science.

Volatile oils.—Volter and Darrn have made a set of experiments to determine the relative produce of oils to the raw material employed. The following is the result.

We use the German measures, which approach nearly our own, the Nuremberg pound being equal to .959266 pound Troy, the lb. or civil pound consisting of 16 ounces. Multiplication by this number gives the equivalent in English.

1. *Oil of bitter almonds.*—26 pounds of almonds, pressed cold, and then distilled with water, gave 10½ pounds of fat, and two ounces of volatile oils.

2. *Ol. anisi aeth.*—16 lbs. of anise seeds gave 9 ounces of volatile oil and 10 lbs. 2½ oz. of the same, spec. grav. 0.984.

3. *Ol. anisi stellati.*—10 lbs. of the seeds gave 22 drs. volatile oil.

4. *Ol. calami aromat.*—14 lbs. of dry roots left 20 oz. volatile oil, 118 lbs. fresh roots were peeled and the 25 lbs. of bark left by distillation 3½ oz. of oil; the roots when dried weighed 13½ lbs.

5. *Ol. carvi.*—15 lbs of the seeds gave 7 oz. of oil, 10 lbs. gave 9 oz. of spec. grav. 915.

6. *Ol. caryophyl. aromat.*—1 lb. gave 20 to 21 drs.

7. *Ol. caryophyl.*—6½ lbs. when distilled three times gave 18¼ oz. oil of spec. grav. 1.232.

8. *Ol. ceræ.*—1½ lb. *cer. flav.* gave by dry distillation, 5 oz. 5 drs. of oil.

9. *Ol. coriandri.*—32 lbs. of the seeds gave 2 oz. 9 drs. oil.

10. *Ol. cynæ sem.*—165 lbs. of the seeds left 14 oz. 3 drs. oil.

11. *Ol. cynæ.*—5 lbs. seeds of *cyn. levant.* gave 4 drs. 1 scr. oil, ½ lb. seeds of *cyn. lev.* gave 10 drs. *ext. cyn. aeth*; 2½ lbs. *sem. cyn. barb.* gave 3 drs. 50 grs. oil. 13 lbs. *sem. cyn. natur.* left 2⅝ lbs. of an earthy powder effervescing with acids.

12. *Ol. Fœniculi.*—12 lbs. seeds gave 5 drs. oil, 3 lbs. seeds gave 14½ drs. oil, spec. grav. 0.968.

13. *Ol. junip. bacc.*—21 lbs. of fresh berries left 26 drs. clear oil.

14. *Ol. macis.*—1½ lb. mace gave 18½ drs. oil, of spec. grav. .920.

15. *Ol. marjoranæ.*—82 lbs. left 11 oz. oil.

16. *Ol. menth. piperit.*—374 lbs. of the plant gave 49½ oz.

17. *Ol. petroselini.*—4 lbs. seeds afford 1½ oz. of an oil sinking to the bottom of water.

18. *Ol. sinap. sem.*—35 lbs. gave 11 drs. of oil, and by other experiments 15 lbs. gave 6 drs. and 50 lbs. gave 31 drs. The greatest product was 8 drs. oil from 10 lbs.

19. *Ol. æther. tanacet.*—20 lbs. of the tops gave 1 oz. of oil.

20. *Ol. valer. æth.*—10 lbs. of the root gave 12 drs. oil and 22 lbs. gave 18½ drs. of oil, spec. grav. .960.

Records of general science and Central-Blatt.

Composition of Bitumens.—M. Boussingault has, from his researches, been led to the conclusion that the Bitumens should be considered as mixtures of two substances, one liquid to which he has given the name of *petrolene*, the other solid which he calls *asphaltene.* It is the viscid bitumen of Bechelbornn, department of Bas Rhin, which has been particularly the object of the researches of M. Boussingault.

Petrolene.—Is an oily substance, volatile, possessing a bituminous odour, of a pale yellow colour, it is composed of hydrogen and carbon only; it boils at 280° R. (662 F.)—Its specific gravity is 0.891 at 21°, it remains liquid at 12°, is little soluble in alcohol, and very soluble in ether. It is obtained by distilling the bitumen of Bechelbornn with water; it passes over with the aqueous fluid, upon which it floats. Upon analysis its composition is

Carbon	0.885.
Hydrogen	0.115.
	1.000.

The density of its vapour by experiment is 9.415.

From these results it is seen that petrolene is isomeric with the oils of lemon, of turpentine and of copaiba, and that the density of its vapour is nearly double that of the vapour of turpentine. By admitting that 4 volumes of vapour constitute an atom of petrolene, its atomic constitution is the following, $C^{80} H^{84}$.

Asphaltene.—Is solid, black, brilliant, it softens by heat, near 300° R, but is decomposed before melting. It is composed of

Carbon	0.753
Hydrogen	0.099
Oxygen	0.148

Which can be represented by the formula $C^{80} H^{64} O^{6}$ which would seem to prove that asphaltene results from the oxidation of petrolene. It is obtained by submitting the bitumen of Bechelbornn, purified by the prolonged action of ether to a temperature from 240 to 250° R.

The asphaltum of mineralogists has a composition very close upon that of asphaltene. *Journ. de Pharmacie.*

Mucate of Methylene.—This combination which may be represented by mucic ether, in which the bicarburet of hydrogen may be replaced by the methylene, has been obtained by M. Malagutti, by following exactly the same process, as for the preparation of mucic ether, but at the same time substituting spirit of wood for alcohol. This compound is solid, fixed, crystallizable, colourless, insipid, soluble in water, but little so in alcohol. It is composed of

Carbon	40.7.
Hydrogen	5.9.
Oxygen	53.4.

its formula according to the author should be $C^{12}\ H^{8}\ O^{7}$ mucic acid $+$ $C^{4}\ H^{4} + OH^{2}$ hydrated methylene, which formula is similar to that of mucic ether recently given by M. Malagutti and which presents a new probability, that the true composition of anhydrous mucic acid is $C^{12}\ H^{8}\ O^{7}$ and not $C^{12}\ H^{10}\ O^{8}$, which has been admitted until the experiment of M. Malagutti. *Ibid.*

St. John Long's Liniment. Mr. Guthrie having had presented to him, for the purpose of trying its effects, some of the once famous liniment of Mr. Long, selected some cases for its application ; and also had it applied to his own person, he being affected at the same time with a pain in the knee, attended with slight lameness. The experiment was conducted openly at the Ophthalmic Hospital, the liniment being applied by Mr. Wood, the person who rubbed under Long. It was used in five cases, besides Mr. Guthries' own ; but the disease of one only is stated, viz—that of a boy who is said to "have come up amaurotic from the country." The result of the treatment is thus given by Mr. Guthrie : It cured my knee and the boy's eye, and did good to all the remaining four. The liniment appears to be perfectly mild and harmless, looking like thick yellow cream, and having a faint turpentine smell. Applied to the skin it felt cool and agreeable, and not in the slightest degree stimulating. It was assiduously rubbed on the part by means of a small, soft, round sponge ; and after a sufficient application, the part became red, and finally excoriated and inflamed. Mr. Guthrie attributes the whole effect of the liniment to the mode of application and nothing to its own virtues. In proof of this, he had himself rubbed with soap suds in the same manner as was done with the liniment, and exactly the same result followed. I should have said, if I had been asked, says Mr. Guthrie, that the soap lather was the most severe liniment of the two.

The mystery of St. John Long's operations, and of his (doubtless) occasional success, seems thus cleared up, and we consider the profession much indebted to Mr. Guthrie for its solution. We do not doubt that

this particular mode of counter irritation may be very advantageously applied in many cases, both of acute and chronic diseases.

Lancet.

Some proofs of the efficacy of Guaco.—Some months ago we requested as a favour to be furnished with any facts relative to the medicinal virtues of the Mikania Guaco, which has been introduced, and is cultivated, in many parts of the Island. We also announced that Messrs. Menzies and Morison made a large quantity of the extract. It is unquestionably a plant which possesses more than ordinary powers. Cæsar Hawkins, a few years ago, received some of the plant from Sir Robert Kerr Porter, but he says, "the quantity was not sufficient to investigate the subject completely; it did not seem to him to do more than mitigate the symptoms of Rabies or Hydrophobia. Although I am inclined to think the accounts we have received are much exaggerated, it is well deserving of further trial, *as even a palliation of the frightful symptoms of Hydrophobia is yet a desideratum.*" The following Letter, from an intelligent friend, was given to us for publication: we know so much of the character of the writer, that we unhesitatingly vouch for the correctness and truth of his statements:—

Dear Sir,—I think it a duty to request, as I now do, your publication of my experience of the virtues of the Guaco Plant.

Some months ago, while washing my hands in the dark, I received a sting in the fore-finger of my right hand, from an insect which I believe was the long yellow wasp so common in this island. My hand became in a short time extremely swollen and very painful: I applied Brandy and Laudanum with little or no benefit, and during the night I had frequent recourse for relief to a cold lotion, into which I plunged my hand. The pain and swelling, however, continued almost unabated for some days, and I could scarcely attend to my professional duties on account of the general discomfort and irritation under which I laboured; I could scarcely hold my pen.—I called on my medical attendant, Dr. Prince, who, having the plant growing in his garden, applied some of the bruised leaves, and rubbed the hand all over with them for some minutes. The effect, in almost entirely obviating the pain and materially diminishing the hardness and swelling, was immediate; and from that hour I rapidly recovered. I may also mention, that at the same time I swallowed, by Mr. P.'s sugges tion, about half a wine glassful of the juice.

I take the liberty of mentioning another case. My friend, the Rev. Mr. P., was for some days laid up by severe gouty or rheumatic pains in his feet, which disabled him from walking, and he suffered acute pain during the night. Not regarding the attack as likely to be attended by serious results, he did not call in his medical attendant. We agreed, however,

at my suggestion, to try the Guaco, and that evening got a few leaves of the plant from a neighbouring garden; the effect was immediate relief of the pain. Next morning he sent his servant to the neighbourhood of Stoney Hill, where I understand it abounds, for a quantity: He continued the application, and effectually subdued the pain. I believe his ultimate recovery was also somewhat hastened by the application of cold lotions, in place of an injudicious use of warm wrappings of flannel, which he had adopted.

I once tried the Guaco for toothache. On this occasion I used one of the mixtures sold in the Druggists' shops. I took a small quantity into my mouth, as brandy and laudanum are sometimes applied in similar circumstances: the pain was relieved for two or three minutes, but it returned, and I could not subdue it by that means. I am not prepared, however, to say, that a more careful and judicious application of this valuable medicine might not have accomplished more; and it is especially to be considered, that I did not, when I made the external application, take it internally also, as perhaps I ought to have done.

I am, dear Sir, faithfully yours,

To Dr. Wm. Arnold. W. W. A.

Jamaica Phys. Journ.

Air Plants.—These attach themselves to the driest and most sapless surface, and flower as if issuing from the richest soils. "A specimen of one of these, which I thought curious," says Dr. Walsh, "I threw into my portmanteau, where it was forgotten, and some months after, in unfolding some linen, I was astonished to find a rich scarlet flower in full blow; it had not only lived, but vegetated and blossomed, though so long secluded from air, light, and humidity." The barren pine is not less extraordinary. It also grows on sapless trees, and never on the ground. Its seeds are furnished, on the crown, with a long filmy fibre, like the thread of a gossamer. As they ripen they are detached, and driven with the wind, having the long thread streaming behind them. When they meet with the obstruction of a withered branch, the thread is caught, and, revolving round, the seed at length comes into fixed contact with the surface, where it soon vegetates, and supplies the naked arm with a new foliage. In Brazil it grows like the common plant of pine apple, and shoots from the centre a long spike of bright scarlet blossoms. In some species, the leaves are protuberant below, and form vessels like pitchers, which catch and retain the rain water, furnishing cold and refreshing draughts to the heated traveller, in heights where no water is to be found. The quantity of this fluid is sometimes very considerable, and those who have attempted to reach the flower-stem have been often drenched by upsetting the plant.—*The Vegetable World.*

Citric ether.—In order to prepare this ether, M. Malagutti has followed the process of Thenard. He assigns to it the following properties, it is liquid, of a density of 1.142 at 21°, possesses an odour which is similar to that of olive oil, not volatile, decomposed by heat at 202°, is soluble in sulphuric and hydrochloric acids, nitric acid decomposes it immediately. Analysis has demonstrated its composition to be

Carbon	51.05
Hydrogen	7.29
Oxygen	41.66

Hence the formula is $C^8\ H^4\ O^4$ citric acid $+\ C^8\ H^8 + OH^2$ ether. From this analysis the author concludes, that the formula of citric acid, upon which some doubts still remain, in consequence of certain anomalies which it presents in its combinations with the bases, is $C^8\ H^4\ O^4$, as Berzelius has pointed out. It is especially to clear up this point of theory that M. Malagutti has had in view, in the memoir which he has presented to the academy. *Ibid.*

To obtain large heads on Roses.—In the Horticultural Register we find a method described to obtain large heads on standard Roses by marching in one season.

So soon as the plants indicate the circulation of sap, I begin to take off the head of the stock at the proposed height, bending so that the plant designed to form a head is brought close to the top of the stock. I pare from the stem two or three inches of the bark, with a portion of the wood, at the most convenient part for forming the junction, after which the stock is neatly made to correspond, and in such a manner that the part where the union is intended to take place is very little increased in size. Tonguing should be avoided, since it offers no advantage and often serves to weaken the union. They should be bound together with tape or good matting, and covered with a little moss which should be kept damp. Should the stock be very tall, or weary, the union of the parts would be strengthened and accelerated by making a small slit in the stock, and causing it to dip into the ground, or in a pot of earth placed for the purpose. The slit will heal, and throw out roots, which will support the head considerably; and after the head and stock are united, they will be pared off without the place being seen or the least injury being done.

Jamaica Physical Journal.

CONTENTS.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

MISCELLANY.

THE

AMERICAN JOURNAL

OF

PHARMACY.

JULY, 1837.

ORIGINAL COMMUNICATIONS.

ART. XVII.—ADDRESS DELIVERED TO THE GRADUATES OF THE PHILADELPHIA COLLEGE OF PHARMACY, May 8th, 1837, by Daniel B. Smith, Esq., President of the College.

It is now nearly eight years since I had the pleasure of addressing a class of young men, who, like yourselves, had just completed their studies, and were preparing, as you are now doing, to enter upon the career of busy life. More than one of that class have already gained an honourable distinction as scientific and accurate chemists, and for private worth as well as professional eminence; and the College of Pharmacy may, with a just pride, point to them and to many of their successors, and claim them as her children. Since that period, other duties and avocations have very much withdrawn my attention from the pursuits of our profession, and now that I am called upon, by our Trustees, to address you on this occasion, and to extend to you the hand of fellowship, I feel almost a stranger within our own Hall. I am conscious of not having kept pace with that steady march of improvement which has elevated our profession to the important station it occupies; and which is mainly due to the ability with which its members, in France and Germany, have cultivated the science of Chemistry.

I know not that I can select a more appropriate topic of discussion for the present evening than to call your attention

to the changes which the practice of Pharmacy has undergone, in consequence of that cultivation, and to point out to you, what appear to me to be the changes through which it must still pass.

During a long period of ignorance, our science was the favourite pursuit of the credulous and superstitious; and its history—of no value for any other purpose—will ever constitute the most remarkable record extant of the absurdity and folly of learned ignorance.

It was only at the beginning of the last century, that Pharmacy began to be cultivated on enlightened principles. The researches of NEUMANN and LEWIS, although limited to the trial of the solubility in alcohol and water, of the Materia Medica, furnished the apothecary with a guide, by no means despicable, in the practice of his profession, and continued to be the chief authority in the laboratory, until superseded by the elaborate investigations of our own times.

From the time of these researches, we may perceive the prevalence of more correct views of the nature and objects of Pharmacy. The Dispensatories from this date began to be weeded of useless incumbrances. The old formulæ were displaced to make room for others contrived on just principles, and not with the vain expectation of multiplying the efficacy along with the ingredients of a compound.

In the next stage of pharmaceutic improvement, we find the attention of apothecaries directed to the proximate elements, gum, resin, and extractive; and to the distinctive properties of the various species and modifications and combinations of these principles.

With the progress of general Chemistry, additions were, from time to time, made to the list of proximate principles, and the eager and untiring spirit of research, which explored every kingdom of nature, and which, not satisfied with the innumerable variety of substances scattered around us, sought to invent new, and more useful combinations, did not fail to bring rich contributions to that science, which has been justly called the cradle of Chemistry.

For a long time, organic Chemistry presented the appearance of a mighty maze, to thread the intricacies of which, no clue was to be found. The grandeur and simplicity which characterized the inorganic department of the science, were no longer to be traced when the students entered upon the confines of the living world, and chemists abandoned to a mere empirical language and arrangement the whole of this department of their science.

This apparent confusion is now, however, rapidly giving way to an order, as remarkable for beautiful simplicity in the midst of complication, as general Chemistry has long been for its severe and chaste proportions.

In this stage of improvement in the science of organic Chemistry, it is, as I conceive, of the utmost importance for the members of our profession, to devote their labours to its further advancement, and to appropriate to our peculiar department, the rich fruits of the labours of the continental Chemists.

I know not, young men, that I can present before you, a better guide in the pursuit and improvement of your profession than the example of these celebrated men, your fellow apothecaries in France and Germany.

Allow me to repeat to you the language of a veteran Pharmacien, the celebrated Bouillon la Grange, delivered on a recent occasion before the Society of Pharmacy in Paris:—

"It is then in the laboratories, in those depots where the three kingdoms heap up and confound all that they can offer to suffering humanity, where life and death so nearly touch each other, that Chemistry had her birth.

"The Glaubers, the Kunkels, the Charas, the Lemeries, the Rouelles, the Macquers, the Cadets, the Baumés, the Demachys, prepared the materials of the edifice that was erected for it, and which Lavoisier, Priestley, Berthollet, Guyton, Fourcroy, and Chaptal, overturned to elevate another, which was often decorated with the works of Bayen,

Pelletier, Vauquelin, Parmentier, Deyeux, and Proust.

"I have assisted," continues he, "at this magical and sublime rebuilding. I have had the happiness of seeing these men of genius, and been honoured with their confidence; and agreeably with their prediction, I have seen their favourite science, Chemistry, that child of Pharmacy, enriched with a multitude of new facts, and capital discoveries, advance with a sure step towards the explanation of the grandest phenomena of nature.

"But in the midst of this prosperity, with what joy have I always found its most numerous and ardent followers among the Pharmaciens. You know that Chemistry has never had cause to blush for her cradle. More than once has the first academy in the kingdom, sought, in the ranks of the apothecaries, the men who should make her forget the losses she had sustained."

Let me, then, convey to you a sketch, brief and imperfect as it must necessarily be, of those particulars to which I have called your attention.

The discovery of cyanogen was the first great step in organic researches; for it made known to chemists a pseudo-elementary compound, analogous, in all its chemical relations, to the electro-negative elements; thus destroying the presumption that their peculiar properties always indicated a simple substance. This discovery reduced to a beautiful simplicity the theory of prussic acid and its compounds, and taught chemists the true principles on which to investigate the composition of organic bodies. Another most important step in these investigations, was the theory of saponification. All the vegetable and animal oils are composed of two elements, one of which is an organic acid, and the other an oxide of hydro-carbon. When submitted to the action of metallic oxides and water, the base combines with an atom of water and forms glycerine, while the acid unites with the oxide and forms a true salt, which is either a soap or a plaster.

The theory of the ethers is another of the great discoveries

to which I have alluded. Adopting the views of Berzelius, we may regard the base of the ethers as a hydro-carbon, called *ethule* containing H^5C^4. It is an electro-positive base, analogous to the metals in many of its relations, combining with the electro-negative elements, and yielding an oxide which combines with acids, forming a class of compounds altogether remarkable and peculiar.

The following table will illustrate this theory:—

Ether	ethule + O, or $\dot{E}l$.
Alcohol	$\dot{E}l + \dot{H}$.
Hydro-chloric ether	$El + Cl$.
Hydro-iodic	$El + I$.
Hydro-bromic	$El + Br$.
Nitrous ether	$\dot{E}l + \ddot{N}$.
Acetic ether	$\dot{E}l + \bar{A}$. &c. &c.

We thus see that ether and alcohol differ only by the presence of an atom of water in the latter, and we comprehend at a glance, the chemical relations of the acid ethers, which, without being salts, are analogous compounds with oxide of ethule for their base.

The discovery of the organic alkalies has had a greater influence on the interests of our business, than any other of these researches. The salts of morphia and quinia have already taken the place, in the shops, of the bulky preparations formerly in use, and the latter, especially, has given rise to extensive laboratories, principally devoted to its preparation. Into the composition of all these vegetable alkalies, as into that of ammonia, there enters an atom of nitrogen. We do not know enough of these compounds to refer them to any general law; but it is highly probable, that they also will be found to be compounds of a highly complex radical.

This is the case with the three alkalies of the Peruvian barks—quinia, cinchonia, and aricina. Supposing the existence of a compound radical, consisting of $NH^{20}C^{20}$,

cinchonia is a protoxide, quinia a deutoxide, and aricina a tritoxide of this base.

An equally beautiful instance of this simplicity of arrangement is furnished in the composition of camphor. The essential oil of lemons is a hydro-carbon, containing $H^4 C^5$. It is isomeric with the essential oil of turpentine, which consists of $H^8 C^{10}$. This hydro-carbon is an electro-positive radical, and has received the name of camphene; for its protoxide is the well known substance camphor, its 5-oxide is camphoric acid, and its chloride is the artificial camphor, produced by the action of chlorohydric acid upon oil of turpentine.

Another compound radical of great interest, which has not yet been insulated, is benzule. It consists of $C^{14}H^5 O^2$. Its hyduret is the essential oil of bitter almonds, its oxide is anhydrous benzoic acid, and it forms a chloride, a cyanide, and a sulphuret.

The essential oil of the spirea ulmaria, which is probably the same oil that is obtained from the gaultheria procumbens, is a hydracid, having a very complex radical. This radical is called spirule and consists of $C^{12}H^5O^8$. It forms compounds with chlorine, iodine, bromine, oxygen, and the metals, in a manner perfectly analogous to cyanogen. The oil of cinnamon is also a feeble hydracid, the base of which forms another acid with oxygen.

The ammoniacal salts of many of the organic acids, when decomposed by heat, appear to be resolved into a new compound, which is such that the addition of an atom of water re-converts it into a salt of ammonia.

The oxalate and the benzoate of ammonia, furnish examples of this change, and the substances into which they are changed are called oxamide and benzamide. Urea is an example of this class of substances. Its composition is such, that the addition of an atom of water will convert it into carbonate of ammonia; while, on the other hand, the abstraction of an atom of water converts it into anhydrous cyanate of ammonia.

The conversion, by fermentation, of sugar into alcohol, and of alcohol into acetic acid, are beautiful examples of this interchange of elements; while the isomerism of alcohol and pyroxylic spirit, of sugar, starch, and gum, of citric and malic acids, renders it probable that they will some day be found easily convertible into each other.

The point to which all these discoveries tend, is the arrangement of organic substances under a few general, yet simple and comprehensive laws; which shall reduce its apparent confusion into order, and teach us that the change of one substance into another, takes place by the abstraction or addition of a few simple elements, very often of water and carbonic acid. In the same manner as a pure oxalic acid is prepared from sugar, and true sugar of grapes, made from lignin and fecula, we may not unreasonably expect, that many of the most valuable articles of the Materia Medica will hereafter be elaborated by chemists from materials at our doors, low in value and easy of access. Why, for example, should not camphor be prepared from its base, camphene, or in other words from spirits of turpentine.

It is this wide, and in a great measure untrodden field of research, that we invite you to explore; and the rewards which are held forth to those who enter it with zeal and industry are as solid as they are brilliant. The period is not far distant when it will be thought discreditable to announce a new remedy from the organic kingdom without insulating the principle on which its efficacy depends. We may look with confidence to the future arrangement of organic products into a few great classes of definite, and probably in most cases of binary compounds, formed by the union with the simple bodies, of a series of highly complex radicals, similar to those of which I have spoken.

When this revolution in organic chemistry is effected, our shops, instead of being filled with tinctures in which the peculiar character and virtues of a medicine are overpowered by the stronger stimulant of alcohol, will contain acids and bases and salts, unalterable by age, and capable of the same

extemporaneous use and preparation as the salts and bases in common use. It is to this approaching and inevitable change in the character of Pharmacy that I wish to call your attention and invite your aid.

In order to appreciate fully the rich resources which chemistry is about to pour into the lap of her parent science, we must take into view the striking connection which exists between the natural characters of plants and their chemical constitution. Whole families are almost as distinctly marked by their common physical properties as by their external characters. The alkalies which give to the cinchonas their peculiar virtue, in all probability exist in many of the affiliated families, masked, perhaps, by their combination with now unknown acids, yet not placed beyond the reach of chemical research.

There is also a large class of medicines which we now obtain in the form of an exudation from certain portions of the plant, yet of which the whole vegetable is filled. The milky sap of the poppy circulates through every leaf and stem, and we gather only the small proportion which exudes from a few small punctures. Is it hazarding anything to assert that ere long the plant will be made to yield the whole of its narcotic principle, and that better processes than are now in use will present it to us in the form of morphia, instead of those isomeric and metamorphosed compounds which are now so embarassing to the experimenter.

The rewards of such researches, I have said, are as solid as they are brilliant. They will increase the fortune of their successful prosecutor, while they will establish his fame. They will bring with them, moreover, a richer and more heartfelt reward in the pleasures of a life, with its leisure hours devoted to the calm and pure pursuits of science, ennobling the character by raising it above that all-absorbing devotion to money, which is the curse and the shame of our country, and by teaching that there are other goods—the cultivation of virtue and morality, and the delights of learning—far to be prized above the evanescent glare of wealth.

Upon you and your fellow graduates—young men---must

rest the future reputation and prosperity of this Institution. When some of us who are now present, were engaged in founding the College of Pharmacy, we were told by many who refused to join us, that we were raising up a set of young men to take the business out of our hands. I told them that I did not fear the result; that we *would* educate a race of young men better instructed than ourselves, and that if we should be forced by their competition to reform our own shops and to review our old studies, both we and the community would be the gainers. I am sure that I was right in my opinion, and that a confidence in sound first principles did not on this occasion lead into any error.

Our College has succeeded beyond our most sanguine hopes. Its *elèves* are at this moment among the most enterprising and the best instructed members of their profession, and, unless they and unless you fail in your duty to yourselves and to the community, the reputation of our College and of its members will go on increasing. It is as true in the present case as it is in the broad and general application to society at large, that the existing generation is but the tenant for life of a patrimony which it is bound by the most sacred obligations, to use and to cultivate, and which it has neither a legal nor a moral right to neglect or to destroy. The Institutions of a community—its foundations of charity and the arts—of literature and religion, form the rightful inheritance of each succeeding generation, and woe to that nation which tramples upon or perverts them.

Take away from our own happy Philadelphia her literary associations, her institutions of charity and benevolence, which infuse into her citizens that calmness and steadiness of character that are so strongly marked as to assimilate to their own nature the multitudes of all nations, that an unrivalled prosperity attracts to her door; take away these and their influence, and we should no longer be able to recognise the features to which our affections cling with an attachment as strong as that of the Switzer to his Alpine vallies. Let me beseech you, young men, never to forget that the theatre of action

upon which your lot is cast, requires of you elevated and manly principles; that you can not sustain the station which rightfully belongs to a liberal and learned profession, as ours is becoming, without devoting yourselves to the pursuits of learning no less than to those of business; and that next to the approving smiles of a good conscience, the search after truth and the delights of science and literature are the best solace of a mind chafed with the anxieties of business and oppressed by the unavoidable calamities of life.

ART. XVIII.—ON LOBELIA INFLATA. By William Procter, Jr.

(An Inaugural Essay.)

Among the many medicinal agents of the vegetable kingdom, indigenous to this country, perhaps few have higher claims to the consideration of the physician, than the Lobelia inflata.

Possessed of powerful medical qualities, and capable of making the most decided impressions upon the human system, we have every reason to believe that in time, under the cognizance of the skilful practitioner, it will be numbered among our most valuable remedies.

It was long in the hands of empirics before its introduction into regular practice. The first notice we have of it, as a remedial agent, is in the Massachusetts Reports, for the year 1807 or 8, where an account of its action is detailed in the trial of Samuel Thomson, an empiric, for the alleged murder of an inhabitant of Beverly, by the too free use of this plant.

It has been said that it belonged to the materia medica of the Aborigines of this country, but as far as we have been able to learn, the uses to which they applied it have not been ascertained.

Its medical history is intimately connected with the rise

and progress of a sect in our community, who style themselves Thomsonians, from being the followers of Samuel Thomson, the empiric above alluded to. It stands pre-eminent amongst their remedial agents, and is believed by them to be almost a specific in a variety of diseases. Whether it is really deserving of the high character which they have given to it remains to be determined.

The very fact of its having been thus brought into notice, its powerful and perturbating qualities, and also the numerous and apparently well authenticated eulogiums which have been pronounced upon it as a remedial agent, seem to warrant a more careful investigation of its properties, than has hitherto been made, by physicians or scientific experimenters.

BOTANICAL HISTORY.

The genus Lobelia is distinguished by a five-cleft calyx, five parted corolla, irregular, cleft on the upper side nearly to the base, anthers cohering, stigma two lobed, and capsules two or three celled.

It belongs to the class Pentandria, order Monogynia of Linnæus, and to the natural order Campanulaceæ of Jussieu, Lobeliaceæ of Lindley.

Vulgar names.—Emetic weed, emetic herb, eyebright, wild tobacco, Indian tobacco, etc.

Lobelia inflata. The Indian tobacco is a biennial indigenous plant, varying from six inches to two or three feet in height, according to the vigour of the plant; having a fibrous yellow root, and a solitary, erect, angular, very hairy stem, which in the full grown plant is much branched about midway, but rising from six to ten inches above the highest branches.

The leaves are scattered, sessile, oval, serrate, acute and hairy: flowers disposed in terminal racimes, each flower being pedunculated in the axil of a small leaf. The segments of the calyx are linear and pointed. The corolla is of a delicate blue colour, with a labiate border, the anthers united, curved, and blue, enclosing the stigma. The fruit is an oval, striated,

inflated capsule, crowned with the persistent calyx, and containing in its two cells numerous small brown seeds.

This plant is very common throughout the United States, growing principally by road sides, in neglected fields, and along the edges of woods in clayey sterile soils. It may be noticed along all the roads leading from this city. This species of Lobelia begins to bloom in the last days of 7th month, (July) and its flowers continue to expand in succession until the end of 10 mo. (October.) Dr. William P. C. Barton mentions his having seen it bloom on the 16th of 11th mo., and I can corroborate this statement from having observed an individual plant in flower on the 6th day of the same month on the road between Baltimore and Belair.

When wounded it emits a milky juice. The whole plant is possessed of active properties, but the leaves and capsules are to be preferred, owing to the large amount of ligneous fibre contained in the stalks.

The time for gathering the Lobelia inflata is when the capsules upon the lower parts of the stem and branches are well formed and numerous, while the flowers are still upon their summits, which generally occurs between the latter part of the 8th and the beginning of the 10th month. After being plucked its roots should be deprived of all extraneous matter by washing, and then carefully dried in the shade, in an *upright* position, as the seeds are liable to escape by the shrinking of the valves at the top of the capsule.

PROPERTIES.

Dry Indian tobacco has a slightly irritating odour, and when chewed, though at first productive of but little sensation, communicates a burning acrid impression to the posterior part of the tongue and fauces, very analogous to that produced by the common tobacco; and is attended also by the flow of saliva, and the nauseating effects upon the stomach, so characteristic of that plant. It yields its virtues to water, alcohol and ether, but owing to the solubility of the fatty

matter in the last, it is not fit to be used as a menstruum. The only officinal preparation is the tincture, which is made by macerating two ounces of the dried plant, in one pint of diluted alcohol, for fourteen days; at the expiration of which time it should be filtered. An infusion made by digesting an ounce of the dried plant in a pint of water at 120° Fah., for two hours and strained, possesses its active properties. It should be expressly understood that in making those preparations of Lobelia which require heat, the temperature must not be greater than 160° Fah.; as the acrid principle upon which their activity depends, is more or less destroyed by greater increments of heat.

This plant loses 45 parts out of 64 in drying, or about seven-tenths. Its pulverization is attended with difficulty. The Thomsonians have four preparations of it, viz: first, the powder; secondly, a saturated tincture of the green leaves and capsules; thirdly, a compound tincture of the seeds, and some other articles, and fourthly, a vinegar.

MEDICAL HISTORY.

A difference of opinion prevails respecting the medical properties of this plant.

From the general observations of physicians it is emetic, diaphoretic and expectorant, and also possessed of narcotic, and occasionally of cathartic, powers. According to Dr. Cutler, when the leaves and capsules are chewed for some time, they produce giddiness in the head, and general tremors, followed by nausea and vomiting. When given in the full dose, it produces speedy and severe emesis, accompanied by distressing nausea, copious sweating, and great prostration. It has been said that over doses cause extreme prostration, great anxiety and distress, and ultimately death preceded by convulsions. When administered as an injection it produces the same effects. Its principal use has been in spasmodic asthma, though it has been found useful in catarrh, croup, pertussis and other pectoral affections. Dr. Cutler, upon whose recommendation this remedy was admitted into regular prac-

tice, states, in a communication to Dr. Thatcher, that he had been afflicted with spasmodic asthma for ten years, and was entirely relieved of it, by a tincture of this plant, made by himself, of which he took a table spoonful every ten minutes, until slight vomiting was produced; which occurred with the third dose. (Barton's Botany.) Dr. Randal observes that he has administered the Lobelia inflata to many persons of various ages suffering from asthma and catarrh. In the former he has found it to relieve the paroxysm in a short time, and restore the patient to quietude and ease, when given in doses of a fluidrachm of the tincture several times repeated. In the latter, when administered in small and frequently repeated doses it has operated as a sure and speedy expectorant, producing effects of the most important character, very analogous to those of antimony and squills.

The Doctor also remarks, that he has not observed any narcotic effects from its use when given in small doses.

Lobelia inflata is generally considered by the medical writers of the day as an acrid narcotic, possessed of poisonous properties, and capable of producing death when taken in over doses, if not speedily evacuated from the stomach. On the contrary the Thomsonians assert that its administration is attended with no narcotic or cathartic effects, that the unpleasant symptoms of anxiety, &c. can be attributed to other causes; and that it is not poisonous. But their opinion respecting its narcotic effects is no doubt founded in their ignorance of the true application of the term, believing that to be a narcotic, it must positively have a soporific action on the system—hence their error. I have been informed by persons entirely disinterested, as respects Thomsonianism, that they have derived and observed very beneficial effects to result from its use as an emetic, in a variety of instances.

Lobelia inflata can be administered as an emetic in substance, of which the dose is from 10 to 20 grains; as a tincture of which the full dose is half a fluid ounce: and as an infusion of which a wine glassful may be given and frequently repeated.

CHEMICAL HISTORY.

The subject under consideration, is one of those which has attracted but little attention from analytical chemists, and with the exception of one or two instances, no attempt has been made, as far as I have been able to learn, to ascertain its constituents, and determine their several properties. It was with this view that the following experiments were undertaken, for the assistance of which, choice specimens of the plant were selected.

Experiment 1.—A saturated decoction was precipitated of a dirty yellow colour by the subacetate of lead, and of a grayish white by the protonitrate of mercury. This precipitate when dry was of a dark iron gray colour and was changed to a deep red brown by nitric acid. A portion of it was introduced into a tube retort, and heated to redness, when globules of mercury were condensed in the receiver, and carbonaceous matter left in the retort.

The decoction was not affected by tincture of iodine, solution of gelatin, or the carbonates of soda, and ammonia, and the sulphate of zinc.

Experiment 2.—Another portion of the saturated decoction was digested with hydrate of alumina for twenty-four hours, having previously been decolourized by animal charcoal, filtered and evaporated to one-half. In this state it changed the blue colour of litmus to red, caused a deep yellow brown precipitate with lime water, and a blackish one with the protosulphate of iron.

Experiment 3.—A portion of Lobelia inflata was submitted to the action of water at 160° Fah. for 10 minutes, when a portion of the infusion was removed; the temperature was then raised to 180° Fah., for 5 minutes, and another portion abstracted: additional heat was then applied until 200° was attained, and a third portion removed, after which the temperature was carried to 212°. Upon comparing the results, that first obtained had acquired the least colour but was the most acrid, and just in proportion as the temperature had been

raised the colour deepened and the acrimony diminished until when boiled it possessed less of the latter than either of the infusions. The increments of heat were ascertained by a thermometer suspended in the liquid during the operation.

Experiment 4.—A saturated tincture was submitted to distillation in a glass retort. The product was colourless, having the odour of the tincture without its acrimony, and upon evaporation yielded no residuum. It was probably alcohol holding a portion of a volatile oil in solution.

Experiment 5.—Another portion of the plant was subjected to distillation, in a metallic still, with sufficient water to prevent empyreuma: the distilled liquor had a strong odour of lobelia, but was void of taste. This was returned into the still and another portion of the plant added, and again drawn over.—The last product had a more powerful aroma, from which circumstance, the presence of a minute portion of volatile oil may be suspected.

Experiment 6.—Half a pound of the green plant was digested in one pint of water, acidulated with one drachm of sulphuric acid for four days; then decanted, saturated with magnesia, and filtered. The infusion thus obtained had a very acrid taste, and was of a dark red brown colour. This was submitted to distillation in a retort by the aid of a sand bath. The product had a strong odour of the plant, but was perfectly tasteless, and upon examining the liquid remaining in the retort, it had no acrimony except that which was given to it by the sulphate of magnesia, resulting from the saturation. This experiment was repeated, except that hydro-chloric acid was substituted for the sulphuric, with a like result.

Experiment 7.—A saturated tincture, made with alcohol at forty Baume, was precipitated greenish white, upon the addition of water, and had the properties of a resin.

Experiment 8.—Dry lobelia was submitted to the action of sulphuric ether, at sixty Baume, for twenty-four hours, which, upon decantation, and evaporation, yielded a dark green viscid mass, which was treated with alcohol to remove

the resin. The residue had an unctuous feel, oily odour, and slightly acid taste. This substance left a greasy stain on paper, and inflamed readily, giving off black sooty smoke. It was then dissolved in a solution of potassa, with which it formed a saponaceous compound, as on the addition of muriate of lime, it gave the usual characteristic of soapy solutions.

Experiment 9.—Two ounces of the plant were treated according to the process for obtaining emetia, but without a satisfactory result.

Experiment 10.—Half a pound of the green plant was digested in one pint of water, acidulated with one drachm of concentrated acetic acid, for sixty hours, at a temperature of 70° Fahrenheit; after which it was subjected to decantation and expression.

This liquor, of which twelve fluid ounces were obtained, was saturated with pure magnesia, and filtered, when it was of a dark red brown hue, and had a very acrid taste. It was then treated with successive portions of sulphuric ether, at sixty Baume, until its acrimony was entirely removed.

The ether, after separation from the infusion, had a gelatinous consistence, owing, probably, to the presence of water, and some other matter.

To the ethereal liquor thus obtained, a small quantity of the chloride of calcium was added and the mixture agitated, to separate the water, and the ethereal solution obtained pure and colourless. This, upon evaporation, yielded a small portion of brown transparent matter, of the consistence of thick honey, having an intensely acrid taste, a strong, somewhat aromatic odour, with a decided alkaline reaction on reddened litmus paper.

Experiment 11.—An ounce and a half of the dried seeds of Lobelia, were digested in eight fluid ounces of water, acidulated with half a drachm of concentrated acetic acid, for thirty-six hours, decanted, filtered, and saturated with pure magnesia, and again filtered. The liquor thus obtained was transparent, of a dark olive green colour, of specific gravity 1.01, and possessed of great acrimony. It was then treated

with sulphuric ether, at sixty BAUME, as in the last experiment, which, after agitation with carbonate of potassa to remove any aqueous matter which might adhere, was evaporated. The product was of a light brown colour, having all the properties characteristic of that in experiment 10. This is undoubtedly the active portion of the plant, and from its alkaline nature, deserves the title of *Lobelina.*

Lobelina is of a light brown colour, has the consistence of thick honey, a strong, somewhat aromatic odour, and a highly acrid, burning, nauseous, taste, which is very permanent and irritating, to the throat. It is soluble in water, very soluble in alcohol and ether, and slightly soluble in the fixed oils and turpentine. Its specific gravity is rather more than that of water, as it sinks slowly in that fluid. *Lobelina* has a decided alkaline reaction, saturates acids, and with them forms crystallizable salts. All its combinations with acids are void of odour, and in the plant it is most probably combined with gallic acid. When a small quantity is put upon the end of a glass rod, and a lighted taper applied, it inflames (though not very readily,) giving off copious white smoke.

Experiment 12.—*Lobelina* was combined with sulphuric, nitric, hydro-chloric, acetic, tartaric, oxalic, and gallic, acids, with all of which it formed crystallizable salts, except the acetic.

The sulphate is in granulated crystals, appearing through the microscope of a prismatic form, possessed of all the acrimony of its base, but no odour. It is soluble in alcohol, and very soluble in water.

The nitrate crystallizes in flat tabular formations, is of a light brown colour, and has no odour, but is very soluble in water and alcohol. The muriate crystallizes in radiating needles of a yellow brown colour, and dissolves readily in alcohol and water.

The acetate does not crystallize, but remains in a dark brown syrupy form, and is more soluble in water than either of the others. This circumstance accounts for the fact, that diluted acetic acid is the best menstruum for extracting *Lo-*

belina, as the quantity yielded with this acid is greater than with the others. The tartrate, gallate, and oxalate, are also crystallizable, but owing to the small quantity acted upon, the crystals were very imperfect.

Experiment 13.—Six grains of the Indian tobacco were introduced into a small tube retort, to which a receiver was adapted, and from the receiver a glass tube, of suitable form and dimensions, was so placed as to conduct the gaseous matter under a graduated inverted glass, filled with water. Heat was then applied to the retort, until all the volatile matters had passed over. In the receiver was found two grains of a dark brown oleaginous matter, and in the graduated glass 2.428 cubic inches of gaseous matter, having an excessively fetid odour, of which .906 cubic inches was carbonic acid, as proved by agitation with lime-water, and calculating from the absorption. After the removal of the carbonic acid, the residual gaseous matter inflamed on the application of a lighted taper, and burned for a few seconds with a bluish flame, where in contact with the atmosphere. The oleaginous matter as above procured, is insoluble in water, but very soluble in alcohol, ether, and the volatile oils. It is not affected by nitric, and hydro-chloric acids, but is converted into a soluble substance, by the caustic alkalies. Its specific gravity is .70059. Its odour is nauseous and penetrating, extremely like that of the oil of tobacco, and communicates to the breath an odour very much resembling that of a professed tobacco smoker. Its effects on the animal economy, however, are not similar to the last mentioned article. The properties of the oleaginous matter above mentioned, were ascertained from a quantity obtained expressly for the purpose.

Experiment 14.—Five hundred grains of Indian tobacco were incinerated, and twenty-four grains of ashes were obtained. These were treated with boiling water for five minutes, filtered and evaporated to dryness. The dry mass weighed two or three grains, was of a light gray colour, effervesced with acids, and restored reddened litmus paper to blue. This substance was saturated with nitric acid, and evaporated

to dryness, when the well known and characteristic crystals of nitrate of potassa presented themselves.

Experiment 15.—The exhausted residue of the experiment fourteen, was treated with nitric acid, which caused effervescence, afterwards diluted with water and filtered. This solution was precipitated white by the oxalate of ammonia, and deep blue by the ferro-cyanuret of potassium.

It may be inferred from the foregoing experiments that the principal constituents of the Lobelia Inflata are as follows, viz:

1st. Gum; 2d. Gallic acid; 3d. Volatile oil; 4th. Greenish resin or chlorophyle; 5th. A green, fixed, oily, matter; 6th. *A peculiar, alkaline, acrid principle;* 7th. Salts of lime, and potassa; 8th. Oxide of iron; and to these may be added Lignin.

From the foregoing observations, it will be seen that a marked analogy may be traced between *Lobelina* and Nicotina, the active principle of the Nicotiana tabacum. Its uncrystallizability, its loss of odour by acidifying combinations, its acetate being not crystallizable, and lastly the minute proportion it holds with regard to the plants, bulk for bulk, are some amongst other striking marks of their resemblance.

Judging from a variety of experiments, it can hardly occupy more than $\frac{1}{500}$th, weight for weight, while tobacco, according to Berzelius, yields but one part in a thousand. This remark applies more particularly to the plant as a whole, for the seeds contain, at least, twice the quantity.

The empyreumatic oil, as obtained in experiment thirteen, is so analogous in some of its sensible properties, to that obtained from tobacco, as still farther to warrant the belief of a similarity in chemical properties with that plant, though in a less concentrated form. Had the heat employed in its formation been more moderate and better regulated, there can be but little doubt that the product would have had a still more striking analogy.

It is a curious fact, that the agitation of ether with the in-

fusion, as in experiments ten and eleven, should communicate to it a gelatinous consistence. When exposed for evaporation it lost its consistence and became perfectly fluid.

ART. XIX.—REMARKS ON THE METHODS OF PREPARING IODIDE OF POTASSIUM. By Benjamin F. Hœckley.

(An Inaugural Essay.)

Of all the preparations of iodine, none has attracted more attention or been more extensively employed than the iodide of potassium. This arises, no doubt, from the numerous advantages which this preparation possesses over many of the other iodides. The principal of these advantages are the following:—It is not decomposed by exposure to the atmosphere; it is very soluble in water, and but slightly, if at all, deliquescent; its elements are not separated by heat, and it may readily be obtained in a state of purity. It is also the iodide generally used for procuring others which are insoluble.

The increasing demand for this article has induced me to examine into some of the processes which have been devised for procuring it in a state of purity.

This iodide is officinal in the United States and Dublin Pharmacopœias. The name given to it by the former, is Potassii Iodidum, and by the latter, Potassæ Hydriodas. The first is the more correct, since it is (at least when not in solution) an iodide, and not a hydriodate.

The process of the United States Pharmacopœia for preparing this iodide, is the same, in principle, as that recommended by Turner in 1825, and is as follows:

"Take of solution of potassa two pints; iodine a sufficient quantity. Apply a gentle heat to the solution, and add, by degrees, sufficient iodine to saturate the potassa, and to impart a brown colour to the liquid. Then pass hydro-sulphuric acid through the solution, in a proper vessel, till it loses its brown colour, and retains the odour of the acid. Filter through paper, and having poured hot water upon the residue, again filter. Boil the filtered liquors for a short time, that the hydro-sulphuric acid may be driven off; then, if sulphur has been precipitated, remove it, and saturate any acid that may be present with solution of potassa. Lastly, boil the liquor to dryness. Hydro-sulphuric acid is obtained from sulphuret of iron, by the addition of sulphuric acid diluted with four times its weight of water."

The rationale of this process, on the assumption that the iodide of potassium becomes hydriodate of potassa by solution, may be explained as follows. On adding iodine to a solution of potassa, water is decomposed; one atom of iodine unites with five atoms of oxygen, forming one atom of iodic acid, whilst five atoms of iodine unite with five atoms of hydrogen, forming five atoms of hydriodic acid; these acids, then, severally unite with the potassa, forming iodate and hydriodate of potassa. The proportion of the former salt to the latter, (adopting the atomic weights as given by Turner,) is as 1423 to 5815, or as one to four and one-twelfth nearly. On passing hydro-sulphuric acid through a solution of these salts, it is decomposed, its hydrogen uniting with the iodine and oxygen of the iodate, forming hydriodic acid and water, whilst its sulphur is precipitated. The excess of iodine, which the solution at first contains, is at the same time converted into hydriodic acid, which is directed to be saturated with solution of potassa. The solution, having by these means been converted into one exclusively of hydriodate of potassa, when evaporated to dryness, yields iodide of potassium, in consequence of the hydriodate losing its oxygen and hydrogen.

If instead of adding an excess of iodine (as indicated by its

producing a brown colour in the liquid) just sufficient be added to neutralize the potassa, upon passing hydro-sulphuric acid through the solution, there will be no free hydriodic acid formed, and the subsequent addition of potassa will not be necessary.

One great objection to this process is the employment of hydro-sulphuric acid, which, besides the trouble and expense of forming it, has such an exceedingly offensive odour, as to make it desirable to dispense with it.

The formula adopted by the Dublin College is as follows:

"Take of iodine one part; sulphuret of iron, in coarse powder, five parts; sulphuric acid, seven parts; distilled water forty-eight parts; water of carbonate of potassa, a sufficient quantity; rectified spirit, six parts. Mix the iodine by trituration with sixteen parts of the water, and put the mixture into a glass vessel. Pour the acid, previously diluted with thirty-two parts of the water, on the sulphuret, contained in a matrass; and by means of a tube adapted to the neck of the matrass, and reaching to the bottom of the vessel containing the iodine and water, transmit the gas through the mixture, until the iodine entirely disappears. Filter the liquor, and immediately evaporate it, by a superior heat, to one-eighth part, and again filter it. Then gradually add as much water of carbonate of potassa, as will be sufficient to saturate the acid, which is known by the cessation of the effervescence. Then expose the mixture to heat, until the residual salt is dry and of a white colour. On this pour the spirit, and dissolve by the aid of heat. Lastly, from the remaining salt, pour off the solution, evaporate it to dryness, and keep the residuum in a close vessel."

The first step in this process is to obtain a solution of hydriodic acid. This is done by passing a stream of hydro-sulphuric acid through the water in which the iodine is diffused. The affinity of iodine for hydrogen being greater than that of sulphur for the same element, the acid is decom-

posed, its hydrogen unites with the iodine, and its sulphur is precipitated. The sulphur having been separated by filtration, the solution is evaporated to one-eighth part, and then again filtered. This second filtration is, however, unnecessary, unless there be a new deposition of sulphur, which, perhaps, is rarely the case. The hydriodic acid having been considerably concentrated, is neutralized with carbonate of potassa, and then evaporated to dryness. The residue is then dissolved in the rectified spirit, and again evaporated. This last operation is intended to remove any carbonate or iodate of potassa with which the previous product may have been contaminated.

This College directs a matrass to be used as the vessel in which the gas is to be generated, and the whole of the sulphuric acid to be poured on the sulphuret of iron at once; but a better way is to use a Wolfe's bottle, fitted with a safety tube, and a tube to convey the gas into the water containing the iodine. The sulphuret of iron and water having been introduced into the bottle, the sulphuric acid should be poured through the safety tube by small portions at a time. By these means we may avoid producing more hydro-sulphuric acid than would be necessary to form the hydriodic acid.

The formation of the hydriodic acid, the slow evaporation, and the solution in alcohol, render this process so troublesome and dilatory, that it is, perhaps, seldom employed.

Both Pharmacopœias direct the solution to be evaporated to dryness; but the article has a much better appearance when in crystals, in which state, also, it is not so liable to contain impurities or adulterations.

Another process which is recommended for procuring the iodide of potassium, is, first to form a solution of hydriodate of zinc or of iron, and then to precipitate the oxide or carbonate of these metals by a quantity of potassa or carbonate of potassa, exactly sufficient for combining with the hydriodic acid. The precipitate having been removed by filtration, the solution of hydriodate of potassa is evaporated to dryness or crystallized, as before. The greatest difficulty of this process

is to precipitate the whole of the oxide or carbonate of zinc or of iron, without having an excess of the precipitant. It is preferable, however, to have a slight excess of the latter, than that there should be an excess of either hydriodate of zinc or of iron. If potassa has been used as the precipitant, and there should happen to be an excess of this, the greater part of the iodide of potassium may be separated by crystallization. If the carbonate of potassa has been used, and there be an excess of this, the best mode of proceeding will be as follows:—Evaporate the solution sufficiently far to allow a part of the iodide of potassium to crystallize; separate these crystals and wash them with a small quantity of water; evaporate the remaining solution, together with the washings, to dryness; then dissolve the residue in alcohol by the aid of heat, and lastly, having poured off the clear solution from the insoluble portion, evaporate it to dryness or crystallize.

If the hydriodate of zinc or of iron be in excess, the iodide of potassium cannot be procured pure by crystallization; for in evaporating the solution, the hydriodates of these metals will be wholly or partly decomposed, and the crystals will be contaminated with the oxide of zinc or of iron, and perhaps, also, with free iodine. From these considerations it appears that carbonate of potassa is, on the whole, better adapted for forming the iodide in this way, than the pure alkali.

Another process which has been proposed for obtaining iodide of potassium, consists in adding to a solution of sulphuret of potassium, a sufficient quantity of iodine to precipitate the whole of the sulphur. By this means we obtain a solution of iodide of potassium which must be evaporated in order to procure the iodide in a solid state. For obtaining the iodide in this manner, it is necessary that the sulphuret of potassium should be perfectly pure, not containing any sulphate of potassa, an impurity always present when the sulphuret is prepared as directed by the Pharmacopœias. The labour and cost of forming a pure sulphuret, by the decomposition of sulphate of potassa would render this process less eligible than some of the former methods.

The last process which I shall notice is that described by Turner, in the fifth edition of his chemistry, and is as follows: "add iodine to a hot solution of potassa until the alkali is neutralized, when iodide of potassium and iodate of potassa will be generated; evaporate to dryness, and expose the dry mass in a platinum crucible to a gentle red heat, in order to decompose the iodate. Then dissolve out the fused mass by water and crystallize."

The rationale of the action of iodine on potassa has already been given, on the supposition that the iodide of potassium becomes hydriodate of potassa by solution. If, however, it is supposed that the iodide of potassium exists as such in solution, the rationale will be somewhat different and may be explained as follows:—Five atoms of iodine unite with five of potassium, forming five atoms of iodide of potassium, while the five atoms of oxygen derived from the potassa, unite with one of iodine, forming one atom of iodic acid, which unites with an atom of potassa, forming iodate of potassa. The proportion of the iodide to the iodate, according to these views, is as 1423 to 5515 or as 1 to $3\frac{6}{7}$, nearly.

Berzelius recommends that the iodate of potassa be separated from the solution by crystallization, and that the mother water containing the iodide, be evaporated to dryness and fused, as before. The separation of the iodate is intended to prevent the mass from bubbling up and throwing portions of it out of the crucible.

Of the different processes noticed, this last appears to be decidedly the best, being the most simple and easy of execution.

It has been said, that "iodide of potassium is partially decomposed by sulphuric ether. In digesting iodide of potassium, in this menstruum, it becomes highly coloured with a portion of iodine, which separates from the salt; the iodine attaches itself to the sides of the vessel, at the surface of the liquid; what remains after pouring off this liquid, appears to be a subiodide of potassium." I have repeated this experiment without obtaining any indications of the decomposition of the iodide.

Iodide of potassium is generally stated to be deliquescent, but this is the case only when the air is extremely moist. The iodide, as it is found in commerce, is generally in the form of opaque cubic crystals of a white colour, which decrepitate when heated. A solution of the iodide, when allowed to evaporate spontaneously, deposits crystals which are perfectly transparent and colourless.

Iodide of potassium consists of one equivalent of iodine 126.3, and one of potassium 39.15 = 165.45.

One hundred parts of water, at the temperature of 64°, dissolve 143 parts of the iodide.* It is soluble in one-half its weight of water at 212°. Alcohol of specific gravity, .835, at the temperature of 60°, dissolves about one-eighth its weight; in boiling alcohol it is much more soluble.

Iodide of potassium is decomposed by sulphuric, nitric, and hydro-chloric acids; and by the salts of lead and of mercury.

The only officinal preparation of this iodide is the "Unguentum potassæ hydriodatis," of the Dublin Pharmacopœia.

* Thenard.

SELECTED ARTICLES.

ART. XX.—ON THE CHOICE OF FORMULÆ.—By M. D. G. SALLES, Pharmacien.

AMONG the innumerable formulæ contained in the most accredited Pharmacopœias and Formularies, a certain number are met with, which are every where generally in use; and in which it is admitted that perfect identity ought to exist; this, however, is far from being the case. It is only necessary to refer to the first pages of two or three Pharmacopœias to be convinced that very great differences exist in the composition of medicines which bear the same name. If these differences were always based upon the use to which the medicines are applied, or the doses in which they are administered in each country, and even in each locality, the subject would not call for observation. For example, it would not be more reasonable, to desire to force the people of the north, who generally bear alcoholic liquors well, to employ small doses of concentrated tinctures, as those of the French Codex, than to force upon the inhabitants of the middle regions, the adoption of the large doses of the less concentrated tinctures of the north.

It is then, not of differences of this kind that I intend to speak, but only of those which originate in bad translations, difference in weights and measures, or the caprice of authors, who suppose that they are doing more service by modifying the compositions of medicines in accordance with the opinions and theories of the day, than by presenting them *in the way*

that experience and time have proved them to be efficacious,—such as physicians are accustomed *to prescribe them and patients to employ them.* Generally, no regard is paid to the injury sustained by the art of pharmacy from these changes, and the serious inconveniences resulting from them in practice.*

It is for the purpose of directing the attention of pharmaciens and physicians to this important subject, that I now undertake to re-establish, in their integrity, several formulæ. I shall, in the present paper, confine myself to the *arsenical solution of Fowler* and the *wine of antimony*, to which I shall join as an appendix, the formula of the *pills of Plummer*,

* The following example may be given as corroborative of this statement. For a long time the sulphuret of antimony entered into the composition of a great number of ptisans, very much esteemed in old syphilitic, and cutaneous affections, (ptisans of Feltz, of Pollini, of Astruc, of Vinanche, &c.,) and in spite of those who pretended that the sulphuret of antimony yielded nothing to water, these ptisans produced numerous cures. When Serullas had proved that the sulphuret of antimony always contained a greater or smaller quantity of arsenic, it was held that it was of the highest importance only to employ antimony deprived of the sulphuret of arsenic, by means of ammonia. At present we render justice to our ancestors, and scrupulously prepare these ptisans as they did, with the sulphuret of antimony simply broken down, and with the aid of ebullition long continued, because we have discovered that the prolonged action of boiling water, transforms a part of the sulphuret of arsenic, contained in the antimony, into arsenious acid; and that this acid possesses very active medical properties in the treatment of certain syphilitic and cutaneous affections. One more reflection upon this subject. Within a few months, a skilful chemist has discovered the presence of arsenic in the sulphuric acid of commerce; the inference was consequently drawn by him that no acid should be employed for medical purposes, except that which was carefully purified, because this alone could be pure. But will it not be proper to ask him, if it is certain that the acid thus purified will produce the same curative effects when employed in diseases of the skin and especially when the medication may be continued during months or years? for then extremely minute quantities of an active medicine, repeated during so long a time, ultimately lead to results, which could never have been obtained by wishing to hasten the cure by larger doses, but continued for a shorter period. Let us consult experience in the first instance, and we may reason afterwards.

which appears to be the most rational, at the same time that it is most generally in use.

Arsenical solution of Fowler. Mineral liquor of Fowler. Liquor arsenicalis of the London Pharmacopœia.

The following is the London formula:—

"Take, of sublimed white arsenic, reduced to a very fine powder, of subcarbonate of potassa, from tartar, each sixty-four grains, of compound spirit of lavender, four drachms, of distilled water one pint. Boil the white arsenic and the subcarbonate of potassa, in a glass vessel, until the arsenic shall be entirely dissolved; add the compound spirit of lavender to the liquid when cold, and finally add a sufficient quantity of distilled water to make up the pint."

Let us investigate this. 1st. The sixty-four grains here directed are *Troy grains,* and they are equal to one drachm and $\frac{4}{60}$ of a drachm French weight, since the English drachm sensibly of the same weight as our own, is divided into only sixty grains, instead of seventy-two, and five English grains are equal to six metrical grains. Consequently seventy-seven metrical grains are equal to sixty-four grains *Troy.* 2d. The English pint, used in the shops, is divided into sixteen fluid ounces, the value of which, when aqueous fluids are concerned, as in the present case, hardly differs from the medicinal ounce, each of which contains 480 grains Troy. The liquor thus prepared contains, then, four English grains to the ounce, or $\frac{1}{120}$ of arsenious acid. 3d. The compound spirit of lavender of the London Pharmacopœia, is a true tincture of a deep red colour, prepared by infusing for fifteen days, in three English pints of spirit of lavender, and one of spirit of rosemary, half an ounce of cinnamon, half an ounce of nutmeg, and an ounce of red saunders. Hence it results that the liquor of Fowler almost possesses, in intensity, the smell, taste and colour of compound tincture of lavender, besides the taste peculiar to the arsenical salt which is formed.

All foreign Pharmacopœias, which contain the formula for Fowler's solution, give that of the London, filling up the pint (or octarius) to sixteen ounces in weight. These are, the

American Pharmacopœia, (Boston 1820,) that of Antwerp, (1812,) the Batavian Pharmacopœia, (1805,) that of Belgium, (1825,) those of Edinburgh, Hanover, &c. &c. Now in all these works, the division of the medicinal weights, is the same as in England, that is to say, the pound is divided into twelve ounces, the ounce into eight drachms, the drachm into three scruples, and the scruple into twenty grains, five of which are equivalent to six of the French. Further, without exception, all give under the name of compound spirit of lavender the London formula. Hence it results, most evidently, that every where Fowler's solution contains one hundred and twentieth of its weight of the oxide of arsenic, that it is of a beautiful red colour, and possesses the odour of lavender.

If we consult the formularies and treatises published in France, it will be found that the formula of London has been more or less literally translated, without having regard to the difference of weights, and that arsenic does not constitute but the hundred and forty-fourth part of the liquid, which is sometimes red, as that of Cadet and Ratier, at others colourless as that of MM. Henry and Guibourt who direct the tincture of lavender, although M. Guibourt has pointed out the difference in weight in the second edition of his Pharmacopœia, without having conformed to it. If we turn to the Codex of 1818, we will find, under the name of *Liquor of Fowler,* a solution containing the hundredth part of its weight of oxide of arsenic in place of the hundred and twentieth, colourless instead of being red, and exhaling the odour of melissa instead of that of lavender.

The authors of the Codex have, in truth, determined with great precision, how many drops of their solution are required to represent a grain of arsenic, but this does not prevent the occurrence of errors. Should a French physician desire to repeat experiments made elsewhere, with Fowler's solution, his first care will be to examine, how many drops of the solution he must administer to his patient in order to obtain the results indicated. Now it is evident, that if he does not

take into consideration the difference of the two formulæ, which is morally impossible in practice, he will administer to his patient one-sixth more of the oxide of arsenic. On the contrary, he will administer one-sixth less if the Fowler's solution which is directed in the formularies of Cadet, Ratier, &c., be employed. Between a sixth more and a sixth less, there is nearly the difference of a third, and certainly this is worthy of attention. So much as regards the physician. Is it necessary that I should now show, to how much inconvenience, the pharmacien will be exposed, who may dispense the colourless liquid of the Codex to foreign patients or physicians, or even to countrymen, who have previously made use of it abroad.

I propose then the following formula, which can be translated into all languages without altering the proportions. It forms exactly the $\frac{15}{16}$ of that of the London Pharmacopœia.

℞ — Sublimed arsenious acid	ʒi or 4	grammes or parts.
Carbonate of potassa	ʒi or do.	
Comp. tinct. of lavender	ʒiij or 12	
Distilled water	℥xv or 480.	

Proceed, secundum artem, to obtain fifteen ounces, or 480 grammes or parts of the solution of which the oxide of arsenic will exactly make the hundred and twentieth part.

Antimonial Wine.

Formerly antimonial wine was prepared with glass of antimony or the *crocus metallorum*, but this practice has been renounced generally, since well executed experiments have demonstrated how much its strength is affected by the strength of the wine, and the continuance of the maceration. Almost every where it has been succeeded, by a solution of tartrate of potassa and antimony in Spanish wine, either pure or diluted with water, and designated by the name of improved antimonial wine, or, simply antimonial wine.

It would be as prolix, as fastideous, to exhibit all the variations which this formula presents. But of the large number, three, in particular, are more universally adopted than the

others, and which are incorporated into the best Pharmacopœias.

A. The London Pharmacopœia, that of the United States, (Boston 1826,) the American Formulary of Dr. Benjamin Ellis, (Philadelphia 1826,) direct a scruple of tartar emetic, four ounces of water, and six ounces of Spanish wine. As the medicinal weights are the same in the United States as in England, and as the drachm of the same value as ours, is only divided into sixty grains, it results that the scruple here prescribed is divided into twenty grains, and that each ounce of the wine contains exactly two Troy grains of tartar emetic. This salt makes the two hundred and fortieth part of it.

B. The Edinburgh, the Belgian, (Hague, 1823,) the Finland (Abo, 1819,) Pharmacopœias, those of Hanover (1823,) of Oldembourg, in Westphalia, (1801,) of Prussia, (Berlin, 1813,) prescribe twenty-four grains of tartar emetic to the pound of Spanish wine. Now, in all these countries the medicinal pound is of twelve ounces, and the grains have the same value as the English; this wine, then, still contains two grains of tartar emetic to the ounce, (of sixty to the drachm and of 480 to the ounce,) or the two hundred and fortieth part of its weight.

C. The Military Pharmacopœia of Prussia, (Koenisberg, 1823,) the Swedish Pharmacopœia (Stockholm, 1819,) direct two grains of tartar emetic to the ounce of wine. But as the grains are also sixty to the drachm, the strength of the wine is the same as in the preceding.

We understand, then, that these three formulæ (a scruple to ten ounces, twenty-four grains to the pound, two grains to the ounce,) apparently very different, are nevertheless one and the same; and as this is the one most generally used, it is desirable that it be admitted into the new Codex in the following form:—

℞ Tartrate of potassa and antimony	℈i	or one part.
ℳ Malaga wine	℥x	or 240 parts.

Dissolve and filter.*

* The United States Pharmacopœia, (1831,) has adopted this formula; its advantages may be learned from the U. States Dispensatory.

N. B. The formula of the Codex, 1818, is not in use in the shops. Antimonial wine is generally made with two grains of tartar emetic to the ounce of Malaga wine. This is an extremely convenient formula, as regards the dose of the tartar emetic, but, at the same time, the salt makes only the two hundred and eighty-eighth part, and when dispensed —in accordance with the directions of foreign physicians— the strength of the medicine diminishes in the ratio of six to five.

Plummer's Pills.

The Codex contains no formula for the pills of Plummer, yet this preparation is admitted into a great number of Pharmacopœias, and French physicians prescribe it very frequently. It appears to me of more consequence to insert the formula into the new Codex, as it is one of those which present a greater number of variations.

Many authors make a distinction between the *simple* and *compound* pills of Plummer, by designating, under this last name, those containing the resin of guaiacum, while they appropriate the name of *simple* pills to those into which enters the extract of fumitory, of gentian, or liquorice, &c.; as the one preparation is not less compound than the other, and as physicians never prescribe *simple* or *compound* pills, but only Plummer's pills, the best practice is to choose the formula most in use, and which in addition, affords a medicine least alterable and most efficacious. That of the London Pharmacopœia appears to merit preference in all these particulars; it is as follows:

(*Dr. Plummer's Pills.*) *Pilulæ hydrargyri submuriatis compositæ.* L.

℞	Calomel		
	Golden sulphur of antimony	<u>*aa*</u>	ʒij
	Powdered resin of guaiacum		℥ss
	Alcohol		q. s.

Triturate the calomel with the golden sulphur of antimony, then with the guaiacum, and, finally, add the alcohol to give the proper consistence. This mass is most frequently divided in pills of two grains each, sometimes of three grains, and rarely four; care must be taken, when a foreign order is executed, so as not to divide each drachm into more than thirty, twenty, or fifteen pills, as they may be desired to be of two, three, or four grains each.*

This formula appears preferable to others:—1st. Because it is the one most used, (London, Dublin, Edinburgh, America, &c.) 2d. Because guaiacum possesses properties, even in small doses, well adapted to produce the effect desired from these pills, which the extract of liquorice has not; and the effect of a few grains of the extract of fumitory is extremely doubtful. 3d. Because the alcohol forms, with the resin, a solution which dries rapidly, and which has the double advantage of easily uniting the mass, preserving it from humidity, and preventing all ulterior reaction.† 4th. Because it is the most convenient formula, the best proportioned and most easily prepared extemporaneously, since to obtain any amount whatever of the mass, it is easy to take one-fourth of the quantity of calomel, one-fourth of golden sulphur of antimony, and one-half of the guaiacum, without regarding the alcohol,

* The following recipe is that given in Thatcher's Dispensatory, and employed by some apothecaries in the City of Philadelphia:—

Pilulæ Plummeri.

℞ Antim. sulph. præcip.
Hyd. mur. mitis. aa ʒiij.
Extract Gentian.
Sapo. Cast. aa ʒj.

Let the mercury be triturated with the sulph. præcip., then add the extract and form a mass with jelly of soap.—Ed.

† Lately mucilage of gum arabic has been prescribed, but the mass is very difficult to unite, and the moisture of the mucilage, disposes the calomel and golden sulphur of antimony to react upon each other, which it is of the greatest importance to obviate, as has been shown by M. Guibourt.

which evaporates during the preparation of the pills. These pills do not differ from the compound depurative powder of Plummer. *Journ. de Pharmacie.*

ART. XXI.—NOTE UPON THE PREPARATION OF SIMPLE PLASTER.* By M. A. Gelis.

All chemists agree in stating that the simple plaster of pharmaceutists is a compound analogous to salts. M. Chevreul in his treatise upon fatty bodies, says: "The operation of saponification, thus generalized, shows that the preparation of plaster with litharge is a true saponification, the oxide of lead having the same action upon fat as potassa and soda. Hence it follows that, strictly, plasters can be prepared with saponified fat obtained from an alkaline soap—but before so doing, it is necessary to determine if, in the plaster which it is desired to imitate, there exists a proportion of fat not acidified, so that if this is really the case, this proportion of non-acidified fat may be added to that which is saponified before uniting with it the litharge."

I might easily multiply these quotations, for all who have written upon this subject have taken the same view of the

* The simple plaster of the Codex, corresponds to the Emplastrum Plumbi of the U. S. Pharmacopœia. In the latter work olive oil alone is directed in the proportion of 1 gallon to 5 pounds of litharge and 2 pints of water; in the former we have the following formula.

Take of finely powdered litharge,
olive oil,
lard, aa lbs. iij.
℞. water, quantum suf.

For an exposition of the views entertained at present by chemists upon the changes which these substances undergo in the process by which they are enabled to react upon each other, we refer to the U. S. Dispensatory.

Ed.

case. But no one, as far as I know, has carried the examination further. It appears sufficient to state, that it may be possible to obtain the simple plaster in a different way from the ordinary method, without seeking to ascertain if any advantage would accrue, and if it were not practicable to introduce into practice a ready and easy preparation, in the place of the tedious and disagreeable manipulation which is in use at this time.

Now it appears to me that a note which would have the effect of attracting attention to this subject, would not be entirely destitute of interest, and it is under this belief that I risk the publication of the results of my experiments.

Having dissolved a pound of white Marseilles soap in a sufficient quantity of warm water, I added to the solution 8 ounces of acetate of lead. As soon as the mixture occurred decomposition took place and the plaster floated upon the surface of the liquid, which then became completely transparent. This liquid was not rendered cloudy by sub-acetate of lead, and sulphuretted hydrogen produced but a little abundant precipitate. Having separated it, I washed the plaster, in order to rid it of the soluble salts which it might contain, after which I mixed it, and formed it into rolls.*

Thus obtained, it possessed an extreme whiteness, not to be obtained in the ordinary way. It softens perfectly in warm water, and mixes with great facility. And it does not become coloured as it grows older, which circumstance I attribute to the complete saturation of the acids of the fat; very different in this respect from the other, which always becomes more or less coloured.

It had only one defect. Some hours after its preparation, it assumed a consistence almost too firm, which, however, it but slightly communicated to the compounds into which it was introduced.

It has been said that the simple plaster, although obtained

*This mode of proceeding in the formation of this plaster, was suggested by Mr. Durand, of Philadelphia, in a note upon Ceratum Saponis, published in Vol. VIII., No. I. of this Journal. Ed.

by a chemical process, is prepared with quantities of fatty substances and litharge, which are not in accordance with the proportions proposed for the formation of a definite salt, and theory suggests that a certain quantity of the fatty substances is not acidified, but exists in the state of simple mixture. Nevertheless, the want of success always attending the attempts I have made to mix fatty substances with the plaster obtained by double decomposition, even in small quantities, has induced me to think, that this excess of fat does no remain free, but enters into some state of combination, whether, during the operation, there may be formed at the same time a neutral salt and an acid salt, which theoretically cannot be explained; or whether the salt of lead may be accompanied with an oleo-stearate of glycerine, which has been studied by MM. Pelouze, and Liebig. However this may be, as I think that the simple plaster has not, of itself, well marked medical properties and that it rather affords a vehicle for the application of substances which it is the practice to associate with it, and that the end which I have proposed, is to procure a compound, the physical characters of which will be absolutely similar to those of the plaster obtained by the ordinary method; I endeavoured in the first instance, to obtain the same consistence, by incorporating with my plaster different quantities of fatty substances, but as I have stated before with unsuccessful results. Even olive oil, in very small quantity, afforded me a product entirely devoid of pliancy, and becoming strongly coloured by the light. Besides the same defect, lard communicated to the plaster a degree of rancidity. I then employed fatty acids, which mixed perfectly well. The plaster, which contained one-eighth of its weight of them, lost none of the properties which it possessed, and acquired a consistence entirely similar to that of the plaster obtained by the direct action of litharge upon fatty substances.

I think, then, that by the method which I have proposed, a product will be obtained as cheaply, of greater beauty, and more easily preserved; and, moreover, considerable economy of time will result from the method. 1st. The primary

materials being furnished, the one by a crystallized salt, the other by an article of commerce, always constant in its composition, there will be no necessity of testing them. 2d. Because the duration of the operation will never exceed the time necessary for the solution of the soap. Finally, because the chances of loss are less, since the plaster, from remaining but a few minutes upon the fire, can neither boil over or be burned, as sometimes happens, when, in pursuing the ordinary method, it is forgotten to add water.

Preparation.

℞	Marseilles soap, in slices,	lbj.
	Warm water	lbij.
	Dissolve, and add to the solution	
	Crystallized acetate of lead	℥viij.

Stir the mixture slowly, with a wooden spatula, until the liquid becomes transparent. Decant, re-wash the plaster, and, after having worked, form into rolls. Each roll should weigh one pound.

If it be desired to increase the quantity of the plaster, add two ounces of fatty acids to the pound. I have obtained these fatty acids by decomposing four ounces of the same soap by four drachms of sulphuric acid, diluted with three or four ounces of water.

From the plaster thus prepared, all the compound plasters may be formed, according to the ordinary formulæ.

But the very slight difference which exists between the compounds prepared from the plaster without addition, and that to which the fatty acids have been added, induces me to suppose, that the same result would be obtained, by increasing the amount of the wax or oil entering into these preparations.*

Journal de Pharmacie.

* The Committee of the Society of Pharmacy of Paris, to whom was referred the above essay, composed of MM. Chevalier, Lecanu, and Felix Boudet, reported favourably of the process recommended.

ART. XXII.—ACTION OF RE-AGENTS UPON THE SOLUTIONS OF THE DIFFERENT SPECIES OF CINCHONA OCCURRING IN COMMERCE.* By E. F. Anthon.

The author has devoted much attention to the species of cinchona as they occur in commerce. They were subjected to examination by employing always an infusion of the same strength. One part of bark cut into small pieces was digested with 4 parts of distilled water, allowed to stand at rest for 12 hours, filtered, and then exposed to the action of re-agents. The re-agents employed were the following: 1. Pure ammonia, diluted with pure distilled water to the specific gravity .990; 2. pure hydrate of potash, dissolved in distilled water diluted to the specific gravity of 1.080; 3. carbonate of potash, from bitartrate of potash, disolved in 8 parts of water; 4. iodide of potassium, in 6 parts of water; 5. binoxalate of potash, in 8 parts of water; 6. pure sulphate of soda, in 6 parts of water; 7. pure sulphate of copper, in 12 parts of water; 8. fresh-formed sulphated protoxide of iron, in 6 parts of water; 9. subacetate of lead, a mixture of 6 parts pure acetate of lead with 3 parts of fine scales, and 21 parts distilled water; 10. pure neutral acetate of lead, in 8 parts of water; 11. a saturated solution of pure corrosive sublimate; 12. pernitrate of mercury, by dissolving pure oxide of mercury in boiling nitric acid, diluted with 8 parts of water; 13. subnitrate of mercury, by digesting pure mercury with dilute nitric acid; 15. a saturated solution of tartar emetic, previously purified by crystallization; 16. pure crystallized nitrate of silver, in 16 parts of water; 17. pure sublimed chloride of iron, in 8 parts of water; 18. recently formed muriate of iron, in 8 parts of water; 19. saturated solution of nitrate of barytes; 20. sulphuric acid, specific gravity 1.090; 21. muriatic acid, specific gravity 1.030; 22. infusion of galls, by digesting 1 part of coarsely powdered galls with 4 parts of hot water, and filtering; 23. alcohol of

* Pharmac. Central-Blatt., July, August, 1836.

specific gravity 0.800; 24. lime dissolved in 12 parts of water. The species are named according to the nomenclature of Martius.

CINCHONA RUBRA.

1. *Properties of the Infusion.*—Almost colourless; faintly wine-yellow; passing readily through the filter, with a weak smell of tan, and strong bitter astringent taste.

2. *Ammonia.*—Reddish, gelatinous, flocky precipitate, soluble in excess; after standing from $\frac{1}{4}$ to $\frac{1}{2}$ hour, passing into pink; and after 24 hours, occupying $\frac{1}{2}$ of the bulk of the solution; the supernatant liquor clear, brownish red.

3. *Potash.*—Same as ammonia; only the precipitate is less voluminous and lighter coloured.

4. *Carbonate of Potash.*—Like the ammoniacal precipitate; the precipitate after 24 hours occupies only $\frac{1}{6}$ of the bulk of the liquid.

5. *Iodide of Potassium.*—Fine divided white flocks, forming in $\frac{1}{2}$ an hour larger flocks, which after 24 hours still continue to float.

6. *Oxalate of Potash.*—Strongly a white turbidness, becoming flocky in half an hour.

7. *Sulphate of Soda.*—No precipitate.

8. *Sulphate of Copper.*—The same.

9. *Sulphate of Iron.*—Pure light green colour, still clear after 24 hours.

10. *Subacetate of Lead.*—White gelatinous precipitate, after 24 hours occupying half of the bulk of the solution.

11. *Acetate of Lead.*—Strong white turbidity, quickly forming flocks, occupying in 24 hours from $\frac{1}{4}$ to $\frac{1}{3}$ of the bulk of the fluid.

12. *Chloride of Mercury.*—White turbidness, quickly forming numerous flocks, occupying after 24 hours from $\frac{1}{4}$ to $\frac{1}{3}$ of the bulk of the fluid.

13. *Pernitrate of Mercury.*—Yellowish white turbidness becoming fine flocks in $\frac{1}{4}$ of an hour; in 5 or 6 hours settling into a yellowish brown gelatinous precipitate.

14. *Nitrate of Mercury.*—White turbidness quickly forming fine flocks, settling in ½ an hour into a light greenish brown precipitate; occupying, after 24 hours, ¼ of the bulk of the fluid. Supernatant liquor straw yellow, clear.

15. *Tartar Emetic.*—Copious white turbidity, quickly forming white flocks, and after 5 or 6 hours a white gelatinous precipitate, occupying in 24 hours ½ of the bulk of the fluid.

16. *Nitrate of Silver.*—After ½ an hour, copious white turbidness; after 24 hours, flocky brownish gray precipitate.

17. *Chloride of Iron.*—Pure light green colour; clear after 24 hours, granular flocky, brownish gray sediment; supernatant liquor, clear and light green.

18. *Chloride of Tin.*—White turbidness; after ¼ of an hour flocks; after 24 hours occupying $\frac{1}{6}$ of the bulk of the liquid.

19 to 21. *Nitrate of Barytes, Sulphuric and Muriatic Acids.*—No change.

22. *Infusion of Galls.*—Slight turbidness; after 2 hours fine flocks; after 24 hours a yellow sediment.

23. *Alcohol.*—No change.

24. *Lime.*—Copious white turbidness; in ½ an hour yellowish white flocks, then a gelatinous sediment.

CINCHONA FLAVA DURA.

1. Light-wine-yellow, easily passing through the filter, bitter, astringent, strongly acid reaction.

2. Light brown; in 24 hours clear.

3 and 4. Action the same as that of ammonia.

5. At first no change; in half an hour a brown colour without turbidness.

6. White turbidity; in a few hours a granular flocky white sediment.

7 and 8. No change.

9. Light yellow colour; after 24 hours still clear.

10. Copious white turbidness; in one hour a sediment, which in 24 hours occupies a quarter of the bulk of the liquid.

11. Like the subacetate of lead.

12. Turbid; in two hours reddish flocks.

13. Yellowish white turbidness; in a quarter of an hour dirty-reddish yellow gelatinous flocks, which occupy in 24 hours half of the bulk of the liquid.

14. Yellowish white turbidness; in a half an hour or three quarters, a yellow gelatinous sediment, which in 24 hours occupies one-fifth of the bulk of the fluid; the supernatant liquor clear, pure bright yellow.

15. No change.

16. Slight turbidness; in 3 or 4 hours the light brown flocks become darker.

17. Greenish brown colour; still clear after 24 hours.

18. Copious white turbidness, in a few minutes flocks; in half an hour a gelatinous sediment, which in 24 hours occupies one-eighth of the bulk of the liquid.

19. Scarcely any muddiness; in 2 hours light reddish flocks.

20 and 21. No change.

22. Turbidness; in 2 or 3 hours light reddish brown cheesy flocks.

23. In 24 hours scanty gelatinous flocks.

24. No change.

CINCHONA FLAVA FIBROSA.

1. Light wine yellow, readily passing through the filter; smells weakly of tan; taste slightly bitter, astringent; reaction acid,

2. Yellowish white turbidness; soluble in the smallest excess, leaving a yellow colour; in 4 hours the liquid becomes brownish red.

3. The same.

4. Yellowish white turbidness; precipitate soluble in an excess, leaving a pure yellow colour; in an hour the colour changes, as with ammonia.

5. At first no precipitate; after an hour a yellowish red turbidity; in 5 or 6 hours reddish flocks form a sediment.

6. At first no change; in a few minutes whitish turbidness; in 24 hours reddish flocks form a sediment.

7 and 8. No change.

9. Lively green colour, clear; in an hour slightly turbid; in 4 or 5 hours greenish black flocks; the supernatant liquor clear green.

10. Flocky light yellow precipitate; in half an hour a sediment: supernatant liquor whitish, turbid.

11. Flocky dirty reddish white precipitate; in one-half to three-quarters of an hour large gelatinous flocks; supernatant liquor clear, colourless.

12. Copious whitish turbidity; speedily fine flocks, in half an hour subsiding, and in 24 hours occupying one-third of the bulk of the solution; supernatant liquor clear, colourless.

13. Much yellowish red brown turbidness; speedily fine flocks; in half an hour a sediment, which in 24 hours occupies half the bulk of the liquid; supernatant liquor clear, colourless.

14. Copious yellowish white turbidness, speedily fine flocks; in three-quarters of an hour to one hour a sediment, and a brown colour in 24 hours occupying one-third of the space of the liquid; supernatant liquid clear, somewhat yellowish.

15. Much turbidity; in a few minutes whitish flocks; in an hour a sediment, which in 24 hours occupies one-half of the bulk of the liquid; supernatant liquid clear, colourless.

16. At first no change; in a quarter of an hour a violet blue colour; subsequently, a turbidness; in 3 hours brown flocks.

17. Greenish brown colour, clear; in half an hour turbid; in 5 or 6 hours greenish black flocks, forming a sediment.

18. Much turbidness; in a few minutes fine flocks; in half an hour a gelatinous yellowish white sediment; supernatant liquid whitish, turbid.

19, 20 and 21. No change.

22. Large cheesy dirty light yellow flocky precipitate.

23. No change.

24. At first no change; in 1 or 2 hours slight turbidness; in 24 hours flocks becoming a light red sediment.

ART. XXIII.—ON THE SOURCES AND COMPOSITION OF GAMBOGE, WITH AN EXAMINATION OF SOME ANALOGOUS CONCRETE JUICES. By ROBERT CHRISTISON, M.D., Professor of Materia Medica in the University of Edinburgh.

(Read before the Royal Society of Edinburgh, March 7, 1836.*)*

THIS memoir is published in Sir W. Hooker's Companion to the Botanical Magazine, a work which has long been eminent for the value of its contents, and which, first conducted by Mr. Curtis, is the oldest of all the botanical periodicals in this country. As it is the oldest, so also it is the best. While perusing the admirable article of Dr. Christison, we received the thirteenth number of the Madras Literary and Scientific Journal, (a work of great merit,) for which we are indebted to the kindness of the Editor. It contains a paper by our friend Dr. Wight, relative to the plant which affords the Gamboge, from which we will present our readers with the knowledge of botanists upon this subject. Dr. Wight and Mr. Arnott, in their Prodromus of the Botany of India, have stated that the *Xanthochymus ovalifolius* is the plant from which gamboge exudes. Dr. Graham, of Edinburgh, in a letter to Dr. Wight, affirms that the plant is "undoubtedly the *Garcinia* (*Mangostana*, Gœrt.) *Morella* of Desrousseaux and Gœrtner. Arnott now thinks it *Garcinia Zeylanica*." Graham conceives that the *Garcinia Morella* is in reality no *Garcinia*, but a *Stalagmitis*, or rather it presents the type of a new genus, which he proposes to term *Hebradendron*. The plant from which Dr. Graham draws these conclusions is, according to Dr. Wight, an exotic in Ceylon, having been found by Colonel Walker near a Dutch fort, and being of very rare occurrence. It is the gamboge of this tree which Dr. Christison appears to have examined, and which is quite different from common Ceylon gamboge. Dr. Wight leaves the question undetermined, but throws out some important

suggestions, which are well worth the attention of Indian botanists.

Gamboge was first brought to Europe by Admiral Van Neck, in 1603. He gave a specimen of it to Professor Clusius, of Leyden, under the name of Ghittaiemou.

In consequence of the poisonous properties of gamboge, it was long before it was introduced into the European pharmacopœias. Now, however, when cautiously employed, it is considered to be one of our safest active purgatives.

The finest gamboge is understood to come from Siam, being imported into England from China, by way of Singapore. The druggist distinguishes three varieties—*Pipe, Cake* or *Lump*, and *Coarse Gamboge.*

"Pipe gamboge, which is invariably the finest, has sold in the London market during the last eight years, at prices varying from 2s. 10d. to 5s. a-pound, exclusive of duty.* Cake or Lump Gamboge is sometimes very nearly equal in quality to the last, but is more commonly somewhat inferior, and, therefore, sells for at least three-pence a-pound less. The two qualities are sometimes mixed in the same packages; sometimes each package contains but one; and frequently, on the other hand, the cases contain not merely Pipe and Cake Gamboge, but likewise more or less of a very inferior sort, by the presence of which the price is materially affected. This inferior sort again, of which there are probably many varieties confounded together in the rude nomenclature of the English drug-market, under the name of *Coarse* Gamboge, and which will be seen presently to be nothing else than a *Cake* Gamboge, of low quality, often constitutes the entire contents of the package. In its crude state this is quite unfit for the purpose of the painter, and is equally rejected for medicinal use; and consequently it bears so contemptible a character in the market, as to bring scarcely 10d. a-pound, when the other sorts are worth three or four times as much. For this state-

* Martin's History of the British Colonies, i. 224. Table.

ment I am indebted to Mr. Stead, an extensive and experienced wholesale druggist in London."

Dr. Christison states that there is no gamboge exported from Ceylon to Europe ; but is it not possible, as it is common about Madras, according to the evidence of Drs. Ainslie and Wight, that it may be imported by another channel ?

Dr. Christison has ascertained that gamboge is also produced in the Island of Borneo, on the authority of Mr. James B. Allan. The author proceeds with the results of his examination of the various kinds of gamboge, which were selected with great care by competent judges. We make the following extracts, by permission:

" 1. *Pipe Gamboge* is so termed in the nomenclature of the drug-market, from its peculiar form. It occurs chiefly in cylindrical masses, from three-quarters of an inch to nearly three inches in diameter, commonly hollow, and often doubled upon themselves, and cohering. Not unfrequently several of these pipes or cylinders are firmly accreted into irregularly-shaped cakes or balls, two or three pounds in weight ; in which, however, the remains of the cavities may be traced, though much flattened. The surface of the unaccreted cylinders is dirty greenish-yellow, and striated—evidently from the impression of the reed-moulds into which it is run when soft. Where several cylinders have been joined together, and squeezed into a cake or ball, the mass is usually wrapped in large leaves, which appear to belong to a malvaceous or bombaceous plant. Pipe gamboge is very brittle, and presents a somewhat conchoidal fracture, the surface of which is smooth, brownish-yellow in tint, and glimmering in lustre. It becomes bright gamboge-yellow wherever it is frayed or rubbed, and very readily forms an emulsion or paste of the same hue when rubbed with the wet finger. It has scarcely any taste ; but after a short time produces a sensation of acridity, especially in the back of the throat. Neither has it any smell; yet the fine dust, raised in pulverizing it, quickly irritates the nostrils,

even in quantities inconceivably minute, exciting a profuse flow of mucus, and some sneezing, but without pain.

"This variety of gamboge is familiarly known to be an excellent and powerful purgative, which in the dose of three, five, and seldom more than seven, grains, produces profuse watery discharges; nor has there ever appeared to me any reason for dreading its effects, as our predecessors did; for its action is seldom or never accompanied with much pain or other uneasiness, if it is thoroughly pulverized with some other finely pulverizable substance, such as cream of tartar. Yet, on the other hand, it is a dangerous poison in large doses; one drachm has proved fatal; and the cause of death is violent inflammation of the bowels. I believe that the occasionally fatal effects of a nostrum much in vogue in the present day, under the name of Morison's Pills, have been satisfactorily traced to an over-dose of gamboge.

"It was this variety which Braconnot analyzed. As for the analysis of Professor John, which seems also to have been applied to the Pipe gamboge, it differs so entirely from what I have obtained from all the varieties I have yet examined, that some error must have been committed in his proceedings. In all probability the error arose from his employing rectified spirit for separating the principles from one another; because rectified spirit, in dissolving the resin, takes up also a considerable part of the gum. The same objection is applicable to the analysis of Braconnot, though he has obtained more nearly the true proportions of the principles.

"The best solvent for separating the resin of pipe gamboge is sulphuric ether. When agitated with the powder, a lively orange-red solution is obtained, which becomes gamboge yellow by dilution, and continues to show this tint when very greatly diluted, proving the exceeding intensity of the colour. On distilling off the greater part of the ether, and then driving away what remains by heating the residue in an open porcelain cup, a very beautiful, brittle resin is obtained, which has in thin layers a deep orange-colour and complete transparency, and in thicker masses a cherry-red tint, so dark as to produce

almost complete opacity, and which possesses, in fine powder a lively gamboge-yellow hue.* It is remarkable that the very volatile fluid, sulphuric ether, adheres with great force to this resin, insomuch as to be the source of much trouble, and even error, in a quantitive analysis. The vapour bath heat of 212° F. I found insufficient to drive off so much ether as to leave the resin firm when cold; even at the temperature of 270°, maintained by means of a muriate of lime bath for six hours, so large a quantity was retained, that the detached principles almost always weighed conjunctly three per cent. more than the crude subject of analysis; nay, a heat of 400°, subsequently applied for four hours by an oil bath, which I considered the highest temperature to be safely applied to the resin, and which sent off copious bubbles of ethereal vapour, still left a slight surplus of weight in the separated principles when summed up.

" The ether leaves, in the case of Pipe Gamboge, a flocculent matter, which, when thoroughly exhausted by the repeated action of the same fluid, coheres somewhat and acquires a very pale yellowish-white colour. In fine specimens of this gamboge, I have always found the flocculent residuum to be composed entirely of gum, presenting the leading characters of the prototype of the gummy principle named *Arabin*, from is forming almost the entire mass of gum Arabic. It is entirely and easible soluble in cold water, forming a pale yellowish solution, which, when concentrated, becomes viscous, and when dried, forms a transparent, reddish substance, of a mucilaginous taste with acridity. Braconnot thought the gum analogous to that of the plum tree; which, however, contains a considerable portion of the insoluble variety of gum named *Cerosin*, a variety entirely absent in Pipe Gamboge.

" The proportions of the two principles vary somewhat, as will appear from the following results of trials made with one

* Its colour is so intense that it communicates an appreciable yellowness to ten thousand times its weight of spirit.

hundred grains of two distinct specimens apparently of the same quality.

	First.	Second.
Resin heated at 400°, till it ceased to lose weight, ...	74.2	71.6
Arabin, or soluble gum, heated at 212°, till it ceased to lose weight, . .	21.8	24.0
Moisture discharged by a heat of 270°, .	4.8	4.8
Woody fibre, ...	trace	trace
Total . .	100.8	100.4

"In another analysis so much as 27.3 per cent. of gum was obtained. But as the resin was not carefully determined, and there was, therefore, no check on the analysis, the accurary of that result cannot be positively relied on.

"It follows that Pipe Gamboge consists of resin and gum, without any volatile oil, which is a very common ingredient of other gummy-resinous exudations. The large proportion of gum accounts well for its easy miscibility with water, by which, on the one hand, its suitableness for the purposes of the painter is judged of, and which, on the other hand, renders it in medical practice convertible into a smooth and perfect emulsion, without any of the additions usually resorted to for that end.

"I have nowhere met with any allusion to the question, in what principle the active properties of Pipe Gamboge reside. Since it consists of nothing else but gum and resin, the natural inference must be, that as gum is always bland and simply demulcent when pure, the acridity will be found to reside in the resin. This I have accordingly ascertained to be the case. The resin of gamboge, heated to 260° to drive away most of the ether, was administered as a purgative to several individuals alternately with gamboge itself; and both were found to occasion identically the same effects in kind—the resin, like the crude drug, occasioning profuse watery discharges, without pain or other uneasiness, in the dose of five

grains. But its operation was certainly different in degree, the effect being always less in the dose of five, or five and a half grains, than from the equivalent dose of seven grains of gamboge, although care was taken to administer both to the same individuals, and in identically the same circumstances, so far as this condition could be secured. I was at first inclined to imagine that the diminution of effect might be owing to a partial change produced by the heat to which the resin had been exposed. But this idea was necessarily abandoned on subsequent proof being obtained that a higher heat of 400°, which is little short of that required to produce chemical disorganization of the resin, has no further deteriorating influence.

"But it may be asked, whether the acridity of Gamboge is a property of the resin itself, or of some principle united with pure resin, and concentrating in itself the whole active qualities of the drug. On this point, chemical analysis has not yet thrown any light; nor have I been able to add anything to what is already known. Certainly no decomposing agent hitherto applied has detached a peculiar active principle from the resin; and it further appears probable that the process of saponification, which might be expected to detach an active principle, if it really were present, not only has no such effect, but even, according to some Pharmacologists, alters materially the action of Gamboge. For it is stated that Gamboge, converted into a soap by the action of an alkali, ceases to be purgative; so that a dose of twenty grains in this form has none of the usual effect, and, on the other hand, acquires diuretic properties. If these arguments, however, seem to favour the opinion that the active principle is nothing else than the resin itself, it should at the same time be remembered as favouring the opposite view—that the greater part of pure resins are nearly or entirely inert; and still more, that it has been proved in regard to the closely allied class of vegetable productions, the fixed oils, comprising several acrid species, such as croton oil, the oil of the physic nut, and some other energetic purgative oils, that their activity is not inhe-

rent in the simple oil, but resides in a peculiar volatile acid principle, which may be detached.

"2. Passing next to the *Lump* or *Cake Gamboge*, it must appear evident, that the composition of this variety will vary much according to its quality. At least from what has been said above of its commercial history, it must either vary much, or we must separate from this sort all the kinds often mixed with it, and vaguely known in trade by the name of *Coarse* Gamboge. The finer qualities of it usually called Cake or Lump Gamboge by druggists, appear from what I have seen, to be tolerably uniform. It is met with in amorphous masses, weighing two or three pounds, and upwards, if unbroken. It presents outwardly no striated marks of fibres. It contains visible fragments of wood, and sometimes twigs of considerable size. It is not dense, smooth in texture, and easily frangible, like the Pipe variety, but full of little air-cells, less easily broken, and also much more difficult to reduce into fine powder. Its fracture is not conchoidal, rather splintery, and quite free from any glimmering lustre. Its colour, however, is much the same with that of Pipe Gamboge; its taste and odour are the same; and it very readily forms, with the wet finger, a smooth, bright Gamboge-yellow emulsion. Possibly the finer sorts which approach Pipe Gamboge in price, may also more nearly resemble that variety in external characters than has been here laid down; but I have not met with any such specimens. True Pipe Gamboge, however, it must be remembered, is often met with in the form of cakes, owing to several pipes or cylinders having been firmly agglutinated while soft.*

"The chemical composition of Cake Gamboge is also materially different. It is not, like the Pipe variety, entirely dissolved by the successive action of the two solvents, sulphuric ether and cold water. About eleven per cent. of

* Cake Gamboge boiled in fine powder with water, forms an emulsion; which is rendered deep green by tincture of iodine; while an emulsion of Pipe Gamboge, similarly prepared, merely becomes somewhat tawny.

insoluble matter remains, which in cold water subsides commonly in two layers—the uppermost white, and very finely pulverulent; the lower one grayish, and rather flocculent. The former proved to be fecula, entirely soluble in boiling water, and then giving an abundant blue precipitate with tincture of iodine—the latter quite insoluble in boiling water with even six hours of ebullition, burning entirely away, with the flame and odour of burning wood, and with a mere trace of earthy residue, and therefore apparently woody fibre or lignin. The analysis of two samples gave results nearly concordant, as follows:—One hundred grains were used, and all visible fragments of wood were excluded.

	First.	Second.
Resin, dried in oil bath at 400°, . .	64.3	65.0
Arabin, dried at 260°, ...	20.7	19.7
Fecula, dried at 212°, ...	6.2	5.0
Lignin, dried at 212°, ...	4.4	6.2
Moisture, ...	4.0	4.2
	99.6	100.1

"The proportion between the gum and the resin is here identically the average proportion already mentioned as existing in Pipe Gamboge; so that, on simply abstracting the fecula and woody fibre, an article is constituted of precisely the same chemical composition. This circumstance, coupled with the presence of the particular principle fecula and the vesicular structure of the cakes, renders it extremely probable, if not certain, that Cake Gamboge is not simply a natural production, but rather a manufactured substance—an adulteration. For in the first place, it is the pure exudation *plus* so much impurity; secondly, fecula, is not known to be produced from the trunks, branches, or leaves of plants belonging to that part of the botanical system in which the true Gamboge tree undoubtedly will be found to be properly placed, and it is therefore almost impossible that its presence depends on

some mere variety in the period of collection or other circumstance in vegetation; and thirdly, the vesicular texture so different from the compact uniform texture of Pipe Gamboge, is exactly what might be expected from the process of wetting the exuded juice, beating it up with other pulverulent substances, and then drying it. It might be objected that eleven per cent. of foreign matter is a small addition for an adulteration. But this amount may, after all, be quite equivalent to the grower's profit from the pure article; and it will presently be seen, that a larger proportion of adulteration may so dilute the yellow tint of the mixture as to render it almost unmarketable.

"We cannot doubt that the resin of Cake Gamboge possesses the same effects on the body with that of the Pipe variety. So that this topic may be passed over.

"3. The *Coarse Gamboge* of some English druggists is classed by others with the Cake variety, and I apprehend correctly, since chemical analysis shows that it is nothing else than the lowest quality of that kind. I have received two specimens from an experienced London druggist, under the name of Coarse Gamboge, one of which represents very nearly the external characters and composition of what has been described above as Cake Gamboge, while the other, which is greatly harder, more earthy in its fracture, and grayish-yellow in tint, both in mass, in powder, and in emulsion, evidently owes these differences to nothing else but a larger proportion of the same, or at least a similar adulterating ingredient. The composition of these specimens was as follows for 100 grains:—

	First.	Second.
Resin, dried in the oil bath at 380°, .	61.4	35.0
Arabin, dried at 212°, . . .	17.2	14.2
Fecula, dried at 212°, ...	7.8	19.0
Lignin, dried at 212°, . . .	7.8	22.0
Moisture disengaged at 350°, . .	7.2	10.6
Total, .	101.4	100.8

With the ligneous fibre I have also included a trace of sandy particles and other impurities.

"4. *Ceylon Gamboge*, as I have seen it, is usually in small irregular fragments, but as originally collected is in flattish round masses, as if moulded into shallow bowls, weighing about a pound or upwards; and it appears to be composed of aggregated irregular tears, with interspaces and cavities, which are lined with a dark powdery matter, or with a powder of an earthy appearance. Altogether it seems a very coarse article. But on attentive examination it will be found, that the tears, of which by far the greater portion of it is composed present the compact texture, smooth fracture, and glimmering lustre of fine Pipe Gamboge; that its powder has an intense gamboge-yellow tint; and that a smooth emulsion is very readily formed by it, with the wet finger. Dr. Duncan, indeed, has stated that it has not the properties of true gamboge;* and I know he referred to its not being sufficiently emulsive to form a smooth mass with water for the use of the painter. But in this he is not quite correct. The specimen of concrete juice adhering to the bark, which was sent to him by Mr. Anderson Blair, is certainly not so emulsive as Siam Gamboge. But the ordinary Cingalese article, also sent by the same gentleman, is much more perfectly so. And the specimen sent by Mrs. Colonel Walker to Dr. Graham, as well as others subsequently sent to myself, comprising a splendid specimen of it adhering to the bark of the tree, seem to me to form with great ease an emulsion no wise inferior in smoothness, and very little, if at all in liveliness of tint, to that of the very best Pipe Gamboge of Siam. On this point I have taken the precaution of consulting an experienced professional colourist; and he reports that Mr. Anderson Blair's specimens present many fragments quite equal to the Pipe Gamboge as a pigment, but that it does not mix well with some other colours, such as Prussian blue, and shows a tendency to curdle with them—an objection, however, from

* Edinburgh New Dispensatory, Ed. 1820. Art. Gamboge.

which I have since been told the finest varieties of Gamboge are not quite exempt. To this testimony may be annexed that of Mrs. Walker herself, who is a skilful colourist, and who both states in her communication to Dr. Graham, that she finds Ceylon Gamboge quite equal to that of Siam, and has since added, in a very interesting letter to myself, that all the additions sometimes made to it by the Cingalese artists, such as lime-juice, the gum of the *Feronia elephantum*, or lime-powder, are not only unnecessary, but have likewise appeared to her even to injure its tint.

"The inference, that good Ceylon Gamboge may be easily put to use in the art of painting, is borne out by its chemical composition. As in the instance of Cake Gamboge, so here, sulphuric ether and cold water do not effect a complete solution, but leave about five per cent. of insoluble matter. This, however, does not contain any fecula; and it appears to be entirely composed of the fibre of the wood and bark introduced accidentally. It presents visible fibres; is insoluble in all simple solvents either hot or cold; burns almost entirely away with a good deal of flame and a smell of burning wood, and has a dark brownish-black colour. The ashes of this residuum, amounting to three per cent. of it, consists of carbonate of lime, with a trace of oxide of iron. The following results were obtained from three analyses of Mrs. Colonel Walker's specimens, evidently different in purity. The quantity used was 100 grains:—

	First.	Second.	Third.
Resin, heated at 400°, ...	68.8	71.5	72.9
Arabin, dried at 240°, ...	20.7	18.8	19.4
Fibre of wood and bark at 212°, .	6.8	5.7	4.3
Moisture, ...	4.6	not ascertained.	
Total	100.9	96.0	96.6

Moisture not reckoned.

Here it is evident that the proportion of gum and resin to one

another is as nearly as possible the same with their proportion in some specimens of fine Pipe Gamboge.

"Having arrived at this result, it appeared to me an object of interest to examine the late Dr. Duncan's specimen of concrete juice adhering to the bark, in order to ascertain whether it is generically the same article with the other specimens whose composition has been already mentioned, and whether its composition throws any light on the cause of the inferior miscibility with water which characterizes this, in common with some other varieties of Gamboge. I could spare only about four and one-third grains (4.329,) without injuring the specimen; but by proceeding carefully, the following results were obtained:—

	Grains.	Per cent.
Resin, heated at 400°, ...	3.270	75.5
Arabin, dried at 212°, ...	0.793	19.0
Insoluble residue, probably Cerasin, because soluble in boiling water, yet not then acted on by iodine, .	0.029	
Probable moisture, say as in Siam Gamboge, ...	0.208	4.8
Total	4.300	99.3

From this analysis it seems to follow, that the present specimen is generically a true Gamboge. It contains indeed between four and six per cent. less gum than Siam Gamboge, and between two and four per cent. less than the other specimens of Ceylon Gamboge which I have examined; but this difference can scarcely be held the less to constitute it a true Gamboge.* Since executing this analysis I have received through the great kindness of Mrs. Colonel Walker, another specimen similar to that of Dr. Duncan. Although I have

* On careful comparison, it appeared that the resin of Ceylon Gamboge produces, in solution, the identical tint and intensity of colour which have been already stated to characterize the resin of Siam Gamboge.

not submitted it to analysis, from unwillingness to spoil the specimen, I am satisfied, from the great ease with which it makes an emulsion with water, that this specimen must contain a full proportion of gum.

" From the whole of the previous account of the properties and composition of the different kinds of Gamboge, the following conclusions may, I think, be reasonably drawn.

" It has just been shown, that the composition of this concrete juice varies somewhat in the respective proportions of its two essential ingredients, as it is produced by the same plant growing in the same climate and country. It is plain, therefore, that a difference in the place of growth of the tree may occasion a similar difference, greater in degree; and consequently that Siam Gamboge may perfectly well be produced by the same species which is known to produce the Gamboge of Ceylon.

" It further appears, that the proportion of gum to the coloured resin may vary somewhat, without the emulsive quality of the article being materially altered; but that a very small diminution of the gum below a certain proportion will render the gum resin incapable of forming a smooth emulsion, which property is indispensable for its employment as a pigment.

" In the next place, there can be scarcely any doubt, that the Gamboge tree of Ceylon may be made to yield, with due care, a fine and perfect Gamboge, so far as concerns the art of painting. And the conditions for success probably are, 1. That the exudation be collected from the tree with more care than at present, so as to be kept free of woody fibre and the darker particles of bark, by which the purity and liveliness of the yellow tint are somewhat impaired. 2. That care be taken to ascertain in what circumstances of season, soil, cultivation, or the like, the exuded juice contains the due proportion of gum, that is, not less than 20.5 per cent. of the gum resin when perfectly dry. 3. That where the gum is rather deficient, it be supplied by express addition. Probably, indeed, the whole Gamboge of Ceylon may be improved by

the addition of three or four per cent. of gum; and, at all events, some kinds of it require such addition, as seems well known to the Cingalese, who, according to Mrs. Walker, when they use it as a pigment, sometimes add a little of the gum of the *Feronia elephantum*, or Wood-apple. In regard to the first of these conditions, it ought to be known, that, according to the only account hitherto obtained of the mode of collecting Gamboge in Siam, namely, the information communicated to Koenig by a Portuguese Priest, who said he had witnessed the process, this variety of the drug is actually prepared, not from the bark, but from the leaves, by bending down the branches, cutting the leaves across, and collecting the droppings. Koenig's account certainly does not seem very probable; yet it ought to be kept in view, and subjected to trial in Ceylon. The Cingalese method is to obtain it from the bark, sometimes by making incisions through it, and sometimes by shaving off portions of the outer bark as large as a man's palm. It seems scarcely necessary for me to point out how readily this crude method will lead to the introduction of woody fibre into the article, or how easily the method may be improved so as to exclude such impurity.

"As to the use of Gamboge in medicine, I am satisfied that the Ceylon variety possesses the properties of the finest Siam Gamboge in full perfection. Mrs. Walker says, that in the Island of Ceylon it is used by the native doctors precisely for the same purposes with Siam Gamboge in Europe and elsewhere. I have made many experiments in my Clinical Wards in the Royal Infirmary, with the article sent by Mr. Anderson Blair, and invariably found it at least as effectual as the common drug used in this country. From comparative trials, indeed, made in the same individuals, I am even of opinion, that Ceylon Gamboge is the more powerful of the two, while it is equally safe and free from any accessory unpleasant operation.

"In conclusion, then, I may venture to express my firm persuasion, that Europe need not be indebted to Siam alone for its Gamboge; and that, with a little enterprise and due atten-

tion on the part of our Government and settlers in Ceylon, Gamboge of the most esteemed quality may be added to the other European exports of that prolific and highly favoured island."

The *Garcinia cambogia, Xanthochymus pictorius,* and *Garcinia pictoria* afford resins which resemble gamboge, but which possess none of its active properties, according to the experiments of Dr. Christison.

British Annals of Medicine.

ART. XXIV.—OBSERVATIONS ON SULPHUROUS ETHER, AND SULPHATE OF ETHERINE (THE TRUE SULPHUROUS ETHER.) By R. HARE, M. D., Professor of Chemistry in the University of Pennsylvania.*

IT is known that when two parts, by weight, of sulphuric acid are distilled with one of alcohol, a yellow sulphurous liquid is obtained. Berzelius alleges, that when this liquid is exposed in an exhausted receiver over sulphuric acid and hydrate of potash, an oleaginous liquid remains, which he designates as "*oil of wine containing sulphuric acid, or heavy oil of wine.*"

This oil is, by the same author, described as being heavier than water, as having a penetrating aromatic odour, and a cool pungent taste, resembling that of peppermint. It is, in fact, the liquid which Hennel first analyzed as oil of wine, without, at the same time, mentioning the process by which it was procured. No doubt the difference between it and that procured by Boullay and Dumas, was, in some degree, the cause of the discordance between his observation and theirs. Ac-

* From the American Philosophical Transactions.

cording to Hennel, the oil of wine consists of an atom of sulphuric acid, and an atom of hydrocarbon: $\ddot{S}+4C+4H$. By the last mentioned appellation, this skilful chemist designates a compound consisting of four atoms of carbon, and four of hydrogen.

Serullas represents the oil in question as consisting of two atoms of the acid, two of hydrocarbon or etherine, and one of water.

To the hydrocarbon of Hennel (4CH,) as the common base of all the ethers, excepting those lately alleged to have mytheline for a base, the name of etherine has been given; so that the heavy oil of wine may be called the sulphate of etherine: or, according to the formula of Serullas, $2\ddot{S}E+\dot{H}$, it is a hydrous sulphate of etherine. It is, in fact, the only compound to which the name of sulphuric ether can be applied with propriety. The yellow liquid from which it is procured, as above stated, may be designated as the ethereal sulphurous sulphate of etherine.

Another oil, lighter than water, resulting from the distillation of the ethereal sulphurous sulphate of etherine, from hydrate of lime, or from potash, is described by Berzelius as oil of wine exempt from sulphuric acid. Of this the odour is represented as disagreeable; and, though nothing is said of its taste, it is to be presumed that it differs from the heavy oil of wine in this respect, as well as in its odour and specific gravity.

Thenard alleges, that when the heavy oil of wine is heated with water for some time, a liquid swims on the water, which, if refrigerated by ice, will, within twenty-four hours, deposit crystals. The mother liquid he calls light oil of wine, while to the crystals he gives the name of concrete oil of wine. Hennel mentions his having obtained a similar product by the reaction of oil of wine with water, or an aqueous solution of potash; and treats the crystalline matter as the base of the heavy oil of wine, deprived of its acid; or, in other words, as his "hydrocarbon;" or, as above mentioned, etherine.

Considering how much has been written on this topic, I

am surprised that I have met with no statements respecting the reaction of ammonia with the above mentioned ethereal sulphurous sulphate of etherine.

Since the year 1818, I have been accustomed to saturate the acid in that liquid by ammonia. The residue being rendered very fragrant, and entirely freed from its sulphurous odour, by admixture with about twenty-four parts of alcohol, was found to constitute an anodyne, possessing eminently all the efficacy of that so long distinguished by the name of Hoffman. When the residue, remaining after saturation with ammonia, was distilled in a water bath, ether came over, and left an oil which I was accustomed to consider as the oil of wine.

I had observed that, in the process above mentioned, there was a striking evolution of vapour, which seemed irreconcilable with the received opinion of the re-agents employed. Since the affinity between the ammonia and sulphurous acid is energetic, it did not appear to be reasonable that a copious escape of the one should be caused by its admixture with the other; and it was no less improbable that the vaporization of hydric ether, in its natural state, could take place at temperatures so much below its boiling point as those at which this phenomenon was noticed. In order to ascertain the truth, I luted a funnel, furnished with a glass cock and an air tight stopple, into the tubulure of a retort, of which the beak was so recurved downwards as to enter and be luted into the tubulure of another retort. The beak of the latter passed under a bell over water.

Both retorts were about half full of liquid ammonia, and surrounded with ice. The apparatus being thus arranged, about a thousand grains of the ethereal sulphurous sulphate of etherine were poured into the funnel, and thence gradually allowed to descend into the ammonia in the first retort. Notwithstanding the refrigeration, much heat was perceptible, and a copious evolution of vapour, which, passing into the second retort, was there absorbed or condensed, none being observed to heat the bell glass. At the close of the operation,

hydric ether, holding oil of wine in solution, floated upon the ammonia in the first retort, and pure ether, of the same kind, floated on the ammonia in the second.

The ammonia in both retorts gave indications of the presence of sulphurous acid, on the addition of sulphuric acid. From these results, I inferred that a chemical compound of sulphurous acid and hydric ether formed the principal portion of the yellow liquid, and might be separated by distillation. Accordingly by means of retorts arranged and refrigerated as above described, I procured a portion of sulphurous ether, which boiled at 44°, and which, when agitated with ammonia in a bottle, produced so much heat and consequent vapour, as to expel the whole contents in opposition to the pressure of my thumb. By employing the same distillatory apparatus, I subjected 2150 grains of the ethereal sulphurous sulphate of etherine to distillation, and obtained 726 grains of sulphurous ether, which boiled as soon as the frigorific mixture was removed from the containing retort. This being redistilled, as in a former experiment, so as to receive the product in ammonia, left in the retort five grains of oil of wine. The resulting ammoniacal liquid, saturated with chloride of barium in solution, gave a precipitate which, agreeably to the table of equivalents, contained 356 grains of sulphurous acid.

The residue of the 2150 grains of ethereal sulphate being subjected to distillation, raising the temperature from 95°, the point at which it had been before discontinued, to 140°, the product obtained by means of a refrigerated receiver weighed 602 grains. This was of course, inferior in volatility to the first portion distilled; and, when redistilled, it was found to contain a small quantity of oil of wine. In fact, it appears, the boiling point of the ethereal sulphurous sulphate rises, not only as the ratio of the sulphurous acid lessens, but also as the proportion of oil of wine augments.

The residual liquid being exposed to the heat of a water bath at 212°, a very fragrant, and well flavoured oil of wine was evolved, and floated upon a quantity of water acidulated by sulphuric or sulphovinic acid.

Agreeably to another experiment, 1750 grains by weight, of the ethereal sulphurous sulphate of etherine, after washing with ammonia, gave 869 grains of an ethereal solution of oil of wine. This being subjected to distillation by a water bath raised gradually to 190°, there remained in the retort 148 grains of oil, beneath which there were a few drops of acidulated water. Agreeably to the result of several experiments, the ethereal sulphurous sulphate of etherine yields about half its weight of the ethereal solution of oil of wine. The quantity is always somewhat less than half when weighed; but the deviation is not greater than might be expected to result from the loss by evaporation, and the diversity of refrigeration employed in the condensation of the ethereal sulphurous sulphate, during the process by which it is evolved.

Under the expectation of procuring a sulphurous ether of a still higher degree of volatility, I associated with the apparatus usually employed in the process for generating hydric ether, a series of tubulated retorts, of which the beaks were recurved downwards in such a manner that the beak of the first communicated with a perpendicular tube, passing through an open-necked cylindrical receiver, so as to enter the tubulure of the second retort, of which the beak was in like manner inserted into a tube passing through a receiver in a third retort, and this communicated in like manner with a fourth retort. The second, third and fourth retorts, and the tubes entering them, were all refrigerated, the first with ice, the second with ice and salt, and the third with ice and chloride of calcium.

By these means, on subjecting to distillation in the first retort 48 ounces of alcohol of 830, and a like weight of sulphuric acid, besides the ethereal sulphurous sulphate of etherine usually resulting from the process, and condensing in the first receiver, it was found that in the other retorts severally, there were liquids of various degrees of volatility. That in the last boiled at 28°, but the boiling points rose gradually as the quantity of the residual liquid diminished.

In order to ascertain the nature of the sulph-acids abstracted

from the ethereal sulphurous sulphate of etherine by the ammonia employed, chloride of barium was added in excess to the resulting ammoniacal solution, until no further precipitate would ensue. The liquid having been rendered quite clear by filtration, soon became milky. By evaporation to dryness, and exposure to a red heat, a residuum was obtained which proved partially insoluble chlorohydric acid, and by ignition with charcoal, yielded sulphide of barium. It appears, therefore, that a hyposulphate of barytes existed in the liquid after it was filtered; as I believe that the hyposulphuric acid is the only oxacid of sulphur which is capable of forming with barytes a *soluble* compound, susceptible, by access of oxygen, of being converted into an insoluble sulphate, and precipitating in consequence.

It must be evident from the facts which I have narrated, that the yellow liquid obtained by distilling equal measures of sulphuric acid and alcohol, consists of oil of wine held in solution by sulphurous ether, composed of nearly equal volumes or weights of its ingredients; also, that the affinity between the *ether* and the acid is analogous to that which exists between alcohol and water. The apparent detection of sulphuric acid in the ammonia, justifies a surmise, that the etherine distils in the state of a hyposulphate, which subsequently undergoes a decomposition into sulphurous acid and sulphate of etherine.

The liquid above alluded to, as resulting from the saturation of the ethereal sulphurous sulphate of etherine by ammonia, and distillation by means of a water bath gradually raised to a boiling heat, is a very fragrant variety of oil of wine. It differs from that described by Berzelius as the heavy oil of wine of Hennel and Serullas, in being lighter and containing less sulphuric acid. I have a specimen exactly of the specific gravity of water, and have had one so light as to float on that liquid. The oil of wine obtained by ammonia approximates, in its qualities, to the variety which Thenard describes as light oil of wine. The presence of sulphuric acid in a definite

or invariable ratio does not appear requisite to the distinctive flavour or odour of oil of wine.

The heavy oil of wine, treated by Hennel as sulphate of hydrocarbon, $2\dddot{S}+4CH$, and by Serullas as a hydrous sulphate of etherine, $4CH+2\dddot{S}+\dot{H}$, I have obtained as above mentioned, by exposing the ethereal sulphurous sulphate of etherine, in vacuo, over the hydrate of lime, or potash, and sulphuric acid. This variety sinks in water, being of the specific gravity of 1.09 nearly; is of a deeper hue than the other, and of a smell less active, with a taste somewhat more rank. A specimen of oil thus obtained being subjected to the distillatory process, a portion came over undecomposed, leaving in the retort a carbonaceous mass. 14 grains of the oil which had not undergone distillation, and a like portion of the distilled oil, were severally boiled in glass tubes with nitric acid until red fumes ceased to appear; about 28 grains of pure nitre were added to each, some time before the boiling was discontinued. The resulting liquid was in each case poured into a platina dish, boiled dry, and afterwards deflagrated by a red heat. The residual mass being subjected to water, the resulting solution was filtered, an excess of nitric acid added, and then nitrate of barytes in excess.

The precipitate obtained from the distilled oil, weighed, when dry, only nine and five-eighths grains while that procured from the oil which had not been distilled, amounted, under like circumstances, to fourteen and one-eighth grains. Ten grains of another portion, left for some time over liquid ammonia, yielded only seven-eighths of a grain of sulphate.

About a drachm of Hennel's oil of wine was subjected to distillation with strong liquid ammonia; fourteen and a half grains came over, retaining the appropriate fragrance and flavour. This yielded, by the process above described, only two grains of sulphate of barytes. After all the water and ammonia had distilled, the receiver was changed, and fourteen grains of oil, devoid of the fragrance and flavour of the oil of wine, were obtained. This yielded one and one-eighth grains of

sulphate. A carbonaceous mass, replete with sulphuric acid, remained in the retort.

Hennel states that when oil of wine was heated in a solution of potash, an oil was liberated which floated upon water, having but little fluidity when cold; and which, in some cases, partially crystallized. When gently heated, it became clear, and of an amber colour. The vapour had an agreeable, pungent, aromatic smell. This oil must have been pure etherine.

It is not improbable that this oil, which may be considered as devoid of sulphuric acid, is more or less liberated in evolving oil of wine, according to the nature of the process employed; and that the oil alluded to by Thenard, and those procured by me by simple distillation, ebullition, or distillation with ammonia or potassium, are mixtures of the etherine with its sulphate in various proportions. As it is well known that the odour of the essential oils is rendered more active by dilution, the livelier smell of the solutions may be consistent with a diminished proportion of the odoriferous matter.

Oil of wine cannot be distilled per se without partial decomposition, which does not take place below the temperature of 300. When subjected to the distillatory process, over potassium, at a certain temperature, a brisk reaction ensued, and the oil and metal agglutinated into a gelatinous mass. By raising the temperature the mass liquefied, and a colourless oil came over, which retained the odour of oil of wine. Meanwhile some of the potassium remained unchanged, and appeared within the liquid in the form of pure metallic globules. On pouring into the retort a portion of nitric acid in order to remove the caput mortuum, ignition took place from the presence of the potassium.

ART. XXV.—OF THE REACTION OF THE ESSENTIAL OILS WITH SULPHUROUS ACID, AS EVOLVED IN UNION WITH ETHER IN THE PROCESS OF ETHERIFICATION, OR OTHERWISE. By R. Hare, M. D., &c., &c., &c.*

Having mixed and subjected to distillation two ounces of oil of turpentine, four ounces of alcohol, and eight ounces of sulphuric acid, a yellow liquid came over, having all the appearance of that which is obtained in the process for making oil of wine, described in the preceding article. On removing, by means of ammonia, the sulphurous acid existing in the liquid, and driving off the ether by heat, a liquid remained, which differed from oil of turpentine in taste and smell, although a resemblance might still be traced. This liquid was without any sensible action on potassium, which continued bright in it for many weeks. It proved, on examination, to contain a small quantity of sulphuric acid. I ascertained, afterwards, that in order to produce these results, it was sufficient to pour oil of turpentine on the mass which remains after the termination of the ordinary operation for obtaining ether, and apply heat. Subsequently it was observed that when the sulphurous ether was removed by heat or evaporation, without the use of the ammonia, the proportion of sulphuric acid in the remaining oil was much greater.

By subjecting to the same process several essential oils, I succeeded in obtaining as many liquids to which the above remarks were equally applicable. With some of the oils, however, similar results were, by this method, either totally or partially unattainable, in consequence of their reaction with the sulphuric acid being so energetic as to cause their decomposition before any distillation could take place. No product can be obtained by distillation with sulphuric acid and alcohol from the oil of cinnamon obtained from cassia. From the oils of sassafras and cloves, but little can be procured.

However, in one instance, by previously mixing the oil of

* From the American Philosophical Transactions.

sassafras with the alcohol, in the manner described in the account given of the first experiment with the oil of turpentine, I succeeded in obtaining in addition to a small quantity of the heavy liquid containing sulphuric acid, a minute quantity of a lighter one, devoid of that acid, which burned without smoke, was insoluble in water and very fluid. I am disposed to consider the liquid thus procured as a hydrate of sassafras oil, or sassafreine, as I would call it, being analogous to hydric ether.

The oil of sassafras, whether isolated or in combination, possesses a remarkable property, which, I believe, has not attracted sufficient observation: I mean that of producing an intense crimson colour, when added, even in a very minute quantity, to concentrated sulphuric acid.

One drop of oil of sassafras imparted a striking colour to forty-eight ounce measures of sulphuric acid, and appeared perceptible when it formed less than a five millionth part. This property was completely retained by the lighter liquid above described as procured from oil of sassafras.

I subsequently observed, that when sulphurous acid, whether in the form of sulphurous ether, in that of a gas, or when in union with water, was brought into contact with any of the essential oils, (including kreosote,) which were subjected to the experiment, they acquired a yellow colour, and a strong smell of this acid.

In the case of the yellow compound thus obtained from any of the essential oils which I have tried, if the sulphurous acid be removed by heat, the oil, by analysis, will be found to yield sulphuric acid. That some acid of sulphur remains in union must be evident, since washing with ammonia will not entirely remove the power of yielding sulphuric acid; and the total absence of the sulphurous smell demonstrates that the sulphurous acid either enters into an intimate combination with the oil, or acquires oxygen sufficient to convert it into sulphuric or hyposulphuric acid.

Those essential oils which contain oxygen, are most affected by the action of sulphurous acid.

Both the oils of cloves and cinnamon, after admixture with sulphurous ether and subsequent distillation, gave, on analysis, precipitates of sulphate of barytes. In the case of cloves, the precipitate amounted to one-seventh of the whole weight.

By distilling camphor with alcohol and sulphuric acid, I obtained a yellow liquid, which, by washing with ammonia and evaporation, in order to get rid of the sulphurous ether, yielded an oil. The oil, by standing, separated into two portions, one solid, the other liquid. The solid portion resembled camphor somewhat, in smell, but differed from it by melting at a much lower temperature, becoming completely fluid at 175°.

I found that the essential oils of cinnamon and cloves possessed an antiseptic power, quite equal to that of kreosote, and that their aqueous solutions, when sulphated, were even superior to similar solutions of that agent.

One part of milk mingled with four parts of a saturated aqueous solution of the sulphated oil of cloves, remained after five days sweet and liquid, while another portion of the same milk became curdled and sour within twenty-four hours. Having on the 2d day of July added two drops of oil of cinnamon to an ounce measure of fresh milk, it remained liquid on the 11th; and, though it finally coagulated, it continued free from bad taste or smell till September, although other portions of the same milk had become putrid. A half ounce of milk, to which a drop of sulphurous oil of turpentine had been added, remained free from coagulation at the end of two days, while another portion, containing five drops of pure oil of turpentine, became curdled and sour on the next day.

A number of pieces of meat were exposed in small wine glasses, with water impregnated with solutions of the various essential oils. Their antiseptic power seemed to be in the ratio of their acridity. The milder oils seemed to have comparatively little antiseptic power, unless associated with the sulphurous acid, which has long been known as an antiseptic.

In cutaneous diseases, and, perhaps, in the case of some

ulcers, the employment of the sulphurous sulphated oils may be advantageous.

A respectable physician was of opinion that the sulphurous sulphate of turpentine had a beneficial influence in the case of an obstinate tetter.

Possibly the presence of sulphurous acid may increase the power of the oil of turpentine as an anthelmintic.

Pieces of corned meet hung up, after being bathed with an alcoholic solution of the sulphurous sulphated oil of turpentine, or with solutions of the sulphated oils of cloves or cinnamon, remained free from putridity at the end of several months. That imbued with cinnamon had a slight odour and taste of the oil.

I am led, therefore, to the impression that the antiseptic power is not peculiar to kreosote, but belongs to other acrid oils and principles, and especially to the oils of cinnamon and cloves.

The union of sulphuric acid with these oils appears to render them more soluble in water: whether any important change is effected in their medical qualities by the presence of the acid, may be a question worthy of attention.

I have stated my reasons for considering the ammoniacal liquid, resulting from the ablution of the ethereal sulphurous sulphate of etherine with ammonia, as partially composed of hyposulphuric acid. By adding to this ammoniacal liquid a quantity of sulphuric acid, sufficient to produce a strong odour of sulphurous acid, and then a portion of any of the essential oils; a combination ensued, as already described, between the oils and the sulphurous acid liberated by the sulphuric acid, so as to render them yellow and suffocating. The habitudes of cinnamon oil from cassia under these circumstances were peculiar. A quantity of it was dissolved, communicating to the liquid a reddish hue. The solution being evaporated, a gummy translucent reddish mass was obtained, which, by solution in alcohol, precipitated a quantity of salt, and being boiled nearly to dryness, re-dissolved in water, and again evaporated, was resolved into a mass having the friability, con-

sistency, and translucency of common rosin; but with a higher and more lively reddish colour. Its odour recalls, but faintly, that of cinnamon; its taste is bitter and disagreeable, yet recalling that of the oil from which it is derived. Its aqueous solution does not redden litmus; nor, when acidulated with nitric acid, does it yield a precipitate with nitrate of barytes.

Of this substance ten grains were exposed to the process above mentioned, for the detection of sulphuric acid, and were found to yield a precipitate of 6.5 grains of sulphate of barytes.

It may be worth while to mention, that in boiling the sulphated oils with nitric acid, compounds are formed finally, which resist the further action of the acid, and are only to be decomposed by the assistance of a nitrate and deflagration. I conjecture that these compounds will be found to merit classification as ethers formed by an oxacid of nitrogen.

One of my pupils, in examining one of the compounds thus generated, was, as he conceived, seriously affected by it, suffering next day as from an over dose of opium. He also conceived that a cat, to which a small quantity was given, was affected in like manner.

I had prepared an apparatus with the view of analyzing accurately the various compounds above described or alluded to, by burning them in oxygen gas; when, by an enduring illness of my assistant, and subsequently my own indisposition, I was prevented from executing my intentions.

ART. XXVI.—REVIEW OF THE "REPORT FROM THE SELECT COMMITTEE ON MEDICAL EDUCATION, WITH THE MINUTES OF EVIDENCE AND APPENDIX." Part III. Society of Apothecaries, London. Ordered by the House of Commons to be Printed, 13th August, 1834.

Continued from page 74.

In what manner are individuals selected for prosecuting, and how are these prosecutions conducted? To convey to our readers a proper view of the harshness with which this power of prosecution has been exercised, and that, too, in direct opposition to the spirit, both of the Charter and Act, we cannot do better than quote the following passages from the evidence before us; the more that it affords an ample proof of the truth of the charges of inconsistency and incompetency which we made against the heads of the Society, at the commencement of the present article. Our first extract shall be from the evidence of John Nussey, Esq.

"What is the principle that has guided your Society in selecting objects for prosecution, as violaters of the provisions of the Act of 1815? The mode in which that is conducted is also by a committee. Who is the chairman of that committee. The master for the time being? Yes. What then is the principle which has guided that committee in its selection of individuals for prosecution? No fixed principle. Informations are sent to the clerk of the Society, who lays them before the committee. On their next meeting, the cases are taken into consideration by the committee, and instructions are given to the clerk to proceed, or not to proceed, as the case may happen. Has the Society been merely passive in receiving such informations, or has it been active in promoting inquiries as to who are violating the Act in different parts of the country? The Apothecaries' Society have had no occasion to be over active in making inquiries; for there have been abundant informations laid before them, more, in point of fact, than they have had the means of prosecuting. We

pay an individual and a clerk an annual sum for looking after such cases in London and its neighbourhood. Does the number of persons who practice as apothecaries in violation of the Act, much exceed the number that you have prosecuted? That is most likely, I think. Has your Society ever endeavoured to ascertain, by causing local inquiry to be made in every part of England and Wales, who the persons are that are actually in practice, which of them practise as apothecaries, and how many do so with, and how many without, the requisite qualification? No. I do not know that the Society have employed any person particularly for that purpose. I believe that during the trials that have taken place in various parts of the country, our clerk has been furnished, when he has attended those trials with information respecting individuals in that neighbourhood, and I may state, that since this committee began to sit, the medical public have been much more in the *qui vive* with regard to unqualified individuals than before; for we have received, in the last three months, more informations on this subject, than at any previous time. Do you recollect what is stated in the preamble to the statute of 1813, to be the object of the statute? "And whereas much inconvenience has arisen from great numbers of persons of many parts of England and Wales exercising the functions of an apothecary, who are wholly ignorant and utterly incompetent to the exercise of such functions, whereby the health and lives of the community are greatly endangered, and it is become necessary that provision should be made for remedying such evils." The object of the statute being to prevent those persons from exercising the functions of an apothecary, who are wholly *ignorant* and *utterly incompetent* to the exercise of such functions, are the individuals whom the Society has selected for prosecution those particular individuals, who, out of the many violaters of the statute, appeared upon inquiry to be the most ignorant? I should say so, for the most flagrant cases have been always the first selected for prosecution. Yet if the choice of the persons to be prosecuted by the Society depends, as you say that it generally does, not upon its own impartial inquiries, but upon the informations

which other parties, oftentimes interested parties, choose to lay before it, is not this the result, that prosecutions fall upon the heads, not so much of the most incompetent as of the most successful unqualified practitioners? I think that such men have seldom or never been selected for prosecution, and the returns made to this committee, as to the number of the penalties recovered, would establish that point. I believe that the Society have received but £130 in penalties, from the first passing of the act of Parliament; therefore they could not be men of very considerable eminence, or of very great reputation who were prosecuted."

An extract is then produced of a letter from a country practitioner, who after having received a respectable medical education for the time, but not, as far as appears from the document, having undergone any examination, was, after being nine years settled in practice, prosecuted and convicted and subjected to a penalty of £20 and costs, the latter being £400. To enable him to dispense with impunity he took a qualified partner, but notwithstanding this, he was at the date of writing, threatened with another action. The examination then proceeds as follows:—

"If the statement in this letter is to be believed, it would appear that this gentleman underwent a very respectable course of medical education, and that the Society, therefore, does not confine its prosecutions to the most ignorant and incompetent of the persons exercising the functions of an apothecary without a qualification? That may be true, but we have no means of knowing, in the first instance, what the qualifications are, of such individuals. Informations are sent up to us by other professional gentlemen in the neighbourhood, who represent the hardship of a man, of perhaps an active and intelligent mind in other respects, running away with the business that formerly belonged to them; and therefore calling upon the society to protect them under those circumstances. The Society have no alternative, but of proceeding at once against a man, where the clearest evidence exists of his being an irregular practitioner. But considering that the object of the Act is to protect the public against the *wholly*

ignorant, and how great the powers are which the Act confers upon the Society, was not great discretion in the exercise of those powers required, so as to direct them solely against those utterly incompetent persons, from whom danger to the public was to be apprehended? I do not mean to dispute what this gentleman has stated with regard to his education. But a man, no matter what his education may have been, for the sake of getting a livelihood will often descend to such base means, as to render him obnoxious to his professional brethren in the neighbourhood, and in that view men are very frequently pointed out to us. For example, in a recent instance, an individual takes a parish, for that is a great ground of competition; the parishes are put up to the lowest bidder; and I have been told, since I came into this room, that an individual, so circumstanced, has taken a parish for six pounds a year, including all the operations of surgery and medical attendance that may be required, and it is wholly impossible that such attendance can be what it ought to be, at a price so absurdly low as that mentioned. By taking a parish, you mean giving medical attendance, advice and assistance and medicine to the poor of that parish? Yes, and performing all the surgical operations. A man who will degrade himself so far as to undertake duties of that kind, at so insignificant a price, and not being a qualified man, is surely a fair object for the companies' notice. The preamble to the statute does not appear to consider the takers of low parish contracts, but the wholly ignorant, as the persons who ought to be guarded against. Do you not consider, therefore, that it is the latter rather than the first, who are the fit objects for prosecution? I do certainly, and I venture to say that every discretion has been exercised with regard to that. Do you mean to say, that in every case of information against an unqualified person for practising as an apothecary, before a prosecution is decided on, inquiry is made by your Society, what has been his medical education; and that if he appears to be a man of respectable medical attainments, your society in that case forbears to prosecute? That has been our rule to a certain extent. Informations in the country, you say, are principally given by

one practitioner against another. When rivalry must often be the motive that leads to such information, is it not the man who has most success in practice, that is most subject to be informed against? Whenever an information is brought before the committee of our Society, our clerk is directed to write to some agent, living in the neighbourhood of the individual informed against; this agent is directed to collect information concerning the qualifications of the party accused, and evidence in the event of his being prosecuted; and it is upon the report of such agents, that we determine whether we shall proceed or not. Your inquiry seems to be directed to ascertaining rather the truth of the information, than the medical attainments of the individual informed against? I think sometimes it may be so. Do you, or do you not seek for evidence of this character, before you determine whether to prosecute or not; namely, whether the education of the party informed against, has been of a character to render him competent to the exercise of the functions as an apothecary, without endangering the health and lives of the community? We take no other means of making this inquiry, than the one already mentioned, by applying, through our clerk, to some agent in the neighbourhood of the residence of this individual. Is not information respecting the medical education of the party likely to come with most accuracy from himself; and upon his supplying such information, would it not be easy for you, by inquiry to ascertain whether the information was correct, and if it be proved to be correct, then to take it into consideration, whether his education was such as to render him fit to practice as an apothecary; and if so to forbear prosecuting him. Would not such a course be most consonant to the preamble of the Act which describes entire ignorance, and utter incompetency, as the evils intended to be provided against? Yes, admitting that the power with which the Society is invested was discretionary, it would certainly be their duty to look to these points; but as it is not so, I think they have no alternative, upon proper information and evidence of the illegality of such practitioners, but to proceed against them for the sake of those who are already qualified."

Mr. Nussey is then requested to point out the words of the statute which render it imperative upon the society to prosecute upon information being given them, and after some preliminary parrying, at last fixes upon the 14th clause. Now we have this clause before us at this moment, and we defy any human being, however ingenious, to construe it in such a manner, as to render it *imperative* on the Society to prosecute when information is given them against any individual. We give it *verbatim.*

"And to prevent any person or persons from practising as an apothecary, without being properly qualified as such, be it further enacted, that from and after the first day of August, 1815, it shall not be lawful for any person or persons (except persons already in practice as such) to practice as an apothecary in any part of England or Wales, unless he or they shall have been examined by the said court of examiners, or the major part of them, and have received a certificate of his or their being duly qualified to practise as such, from the said court of examiners, or the major part of them as aforesaid, who are hereby authorized, and required to examine all person or persons applying to them, for the purpose of ascertaining the skill and abilities of such person or persons in the science and practice of medicine, and his or their qualification to practise as an apothecary as aforesaid:—provided always, that no person shall be admitted to such examination until he shall have attained the full age of 22 years."

And this is the clause which renders it imperative on the Society to prosecute an individual who may have had his qualifications, both in medicine and surgery, tested by men, whose names carry authority with them wherever medical science is known, who may be willing to submit to another examination conducted by his inferiors in knowledge, but who, because he has not served in a menial capacity for five years, is deemed to have an education so radically defective, that nothing but beginning his studies over again can compensate for the evil. Mr. Nussey's free interpretation of the above paragraph is at variance with that of other office bearers of the Society who admit that there is no clause compelling the Apo-

thecaries' Company to prosecute. From the extract from Mr. Nussey's evidence which we have given above, we are forced to conclude, that the Society acts upon no fixed principles in instituting prosecutions; that it encourages medical men to be spies and informers against each other; that private spleen is the motive which prompts all prosecutions, affording a curious illustration of the standing and acquirements of the general practitioners alluded to above by the master, and that successful practice infallibly brings down the vengeance of the Society upon the head of the unexamined or unapprenticed offender. It would occupy too much time to point out all the inconsistencies and contradictions in that portion of Mr. Nussey's evidence given above. Every one who will take the trouble to peruse it attentively will have no difficulty in detecting them.

The following passage discloses at least one fixed principle in which the Society acts in regard to prosecutions, and that is, to intimidate all it can, and when the offender is too strong, to let him alone. Mr. John Bacot had previously stated that the Society were not bound to prosecute and that they exercised considerable discretion in instituting prosecutions. The examination then proceeds.

"The committee have before them a letter dated Apothecaries' Hall, April 24, 1832, signed by your late brother, Edmund Bacot, clerk and solicitor to the Society, addressed to a person who was a graduate in physic in one of the Scotch universities, and was practising in the north of England. The letter contains the following passage: 'You are not infringing on the rights of the Society of Apothecaries, but are acting contrary to the provisions of an Act of Parliament passed for regulating the practice of apothecaries in England and Wales, of which Act the Society, on any complaint, is bound and compellable to enforce the observance.' From this letter, and others to the same effect, it appears that your Society was in the habit of representing to the parties who were informed against for acting contrary to the provisions of the act of 1815, that the Society had no discretion, but was compelled to prosecute? I know that it was my brother's opinion that the

Society might be compelled to prosecute, when urged to do so by persons laying an information. Upon what that opinion was founded, not being myself a member of the legal profession, I cannot say. If it be so that they have no discretion, they have no more right to exercise forbearance in one class of cases, when the Act has been contravened, than in another? Certainly not, but then discretion is limited by their power, and unfortunately, they cannot prosecute every body. But it appears that in the case of Army and Navy surgeons, they have exercised a discretion in not prosecuting although they were aware that it was an infringement of an Act of Parliament. At the time when they determined to exercise that forbearance, I was not a member of the Court of Examiners; but I have a distinct recollection, from looking at the minute-book, that such suspension of the law was in consequence of a correspondence that took place between the Army and Navy medical boards, the Government and the Society of Apothecaries. A letter from the secretary of war, and from the Army and Navy medical boards requesting the Society to suspend the law in favour of Army and Navy surgeons, followed by compliance on the part of your Society, shows plainly that you did consider yourselves at liberty to forbear prosecuting, if you thought proper, and not as wholly without the power of exercising any discretion? That is true, provided they believed contrary to the opinion that was given that those who were appointed surgeons of the army and navy prior to 1st August, 1815, were not practising as apothecaries prior to August, 1815. If they who were appointed Army or Navy surgeons prior to August, 1815, were properly considered as apothecaries in practice, prior to that date, those who have been appointed since 1st August, 1815, must be considered as apothecaries in practice, subsequently to that date, and in their favour the law has been suspended? Legally speaking, that may be the case ; but we know very well that they, every one of them, have undergone a regular medical education, independently of the great experience they have subsequently acquired."

According to your last answer, regular medical education

and great subsequent experience entitle a party to the suspension of the law in his favour? If that education has been tested by due examination, I certainly do think so. Examination before whom? In the case of the Army and Navy surgeons, not before yourselves. Why then before yourselves, in the case of graduates and licentiates from the universities and colleges of Scotland? From our own experience we may not think, perhaps, that such medical education and examination in Scotland, are so good as may be expected. At any rate, in your previous answer, you have admitted the principle that where the party practising, though contrary to the directions of the Act, has received a competent medical education, then the Society should exercise a discretion, and forbear to prosecute? Certainly, there ought to be, and I believe there generally has been, a discretion of that kind exercised.

It is quite unnecessary to offer any comment on the above evidence, and we hasten to close this section of our examination by presenting our readers with another specimen of inconsistency on the same subject. The witness was Henry Field, Esq., Treasurer of the Society.

"Have the informations upon which the prosecutions of your Society have generally been founded, proceeded in most cases from rival practitioners residing in the same place as the parties informed against? Undoubtedly. Have not the prosecutions instituted upon such informations, sometimes been directed againt persons, who, though not possessing the qualification of apprenticeship required by the Act of 1815, yet were gentlemen who had received a good medical education? I do not think there can have been many of that description; in such cases, why they have not been examined, must have been that they could not prove their apprenticeship. Have there not been many individuals prosecuted, who have gone through all the courses of lectures, and in many cases the hospital practice, required for obtaining degrees or diplomas in the Scotch schools? There may have been a few, but I apprehend, a very few. Is it not unfortunate that the prosecutions directed by the company should have fallen upon

well educated men, rather than upon those who, amongst the whole number of practitioners, were the least qualified from their education to practise? I think that that has been the case. Do you mean to say, that where gentlemen have passed through all the courses of lectures, and the hospital practice required for obtaining degrees or diplomas in the Scotch schools, that these were the individuals who were most ignorant and the least competent to exercise the functions of apothecaries; and, therefore, the most likely to endanger the health and lives of the community? The prosecutions have been principally against the very ignorant, if not entirely. According to your previous statement, it was not the want of education of the party that formed the grounds of prosecution, but the activity displayed by some neighbouring practitioner in discovering that his rival had never served as an apprentice, and in informing against him? I apprehend very rarely indeed; if he was a well educated man he was qualified to be examined. Of what use in court would his good education be, if he had not served an apprenticeship? Of course that made the difficulty. Then, supposing a person to have been well educated, but not to have served the requisite apprenticeship; if such person were informed against and your Society were made cognizant of those facts, have they been wont to forbear instituting a prosecution? I am perfectly sure they would have been unwilling to prosecute. I will not say that they never did, but it must have been a rare occurrence, because they have acted with great lenity, particularly with respect to apprenticeships. Ought they not to select for prosecution the most ignorant? They generally have done so. Might not several instances be produced, where the parties have really received a good medical education? I apprehend very few indeed. * * Has your Society a right to exercise its discretion, whether to prosecute or not, or is it compulsory upon them to do so, whenever they receive information? Not compulsory, absolutely, but they have often been abused in such a manner for not prosecuting, that they could not well avoid it."

The expense of these prosecutions is enormous, and the

amount of penalties recovered exceedingly trifling. The expenses incurred by the Society, in actions and indictments against persons for offences under the act of 1815, to the 17th March 1834, was £6,971 15s. 8d., the penalties recovered £170, and the costs recovered £763 9s., leaving the Society a looser by its prosecutions of the sum of £5,837 16s. 8d.

It is a remarkable fact, that no quacks have been prosecuted, as far as we can ascertain. The witnesses in general assert that it is the most ignorant who are selected for prosecution, but the searching examination of the chairman of the committee, soon brings them to admit, that successful practice is most frequently the test by which they are guided, in visiting offenders with the penalties of the act.

(To be continued.)

MINUTES OF THE COLLEGE OF PHARMACY.

Stated Meeting held March 28, 1837.

The minutes of last stated meeting were read and adopted.

The minutes of the Board of Trustees were read, from which the College is informed that the following gentlemen, having passed an examination before a Committee of the College and the Professors, were duly declared Graduates in the College: viz.

James L. Elliott,	Thesis,	*Magnolia Glauca.*
Gustavus Ober,	"	*Spigelia Marilandica.*
Robert J. Kennedy,	"	*Serpentaria Virginiana.*
Ben. F. Hoeckly,	"	*Iodide of Potassium.*
Wm. Procter, Jr.,	"	*Lobelia Inflata.*
Thos. R. F. Mitchell,	"	*Veratum Viride.*
John Y. Goodyear,	"	*Neutral Mixture.*
Wm. L. Hasbook,	"	*Angustura Bark.*

The following gentlemen were elected Resident Members of the College, viz.:

Edwin A. Hoskins, James Hopkins, John Wetherill, Jr.,

Edward C. Marshall, Jonathan Evans, Jr., George Cuthbert, John C. Lehman, Thomas Cave, William W. Moore, Dr. Wm. Wetherill, Job Jones, and Joseph Hutchison.

The Treasurer's Annual Report of the Finances of the Institution, was laid on the table.

The Annual Report of the Publishing Committee was read.

The Committee on Patent Medicine Directions made a final report, and were discharged.

The College proceeded to the Annual Election, whereupon the following gentlemen were chosen Officers, Trustees, &c., for the ensuing year.

President.

Daniel B. Smith.

1*st. Vice-President*—Henry Troth.

2*d. Vice-President*—Dr. G. B. Wood.

Secretary—Charles Ellis.

Treasurer—Edward B. Garrigues.

Correspondig Secretary—Elias Durand.

Trustees.

Warder Morris,
Richard M. Reeve,
John C. Allen,
John Bringhurst,
Edward Roberts,
Thos. H. Power,
Dillwyn Parrish,
Wm. Biddle.

Publishing Committee.

Daniel B. Smith,
Dr. G. B. Wood,
Dr. F. Bache,
Dillwyn Parrish,
Jos. Scattergood,
Elias Durand,
John C. Allen,
Charles Ellis,
Dr. Jos. Carson,
Wm. Hodgson, Jr.

Extracted from the Minutes.

C. Ellis, *Secretary.*

MISCELLANY.

Adulteration of the Calamine of the shops.—Mr. Robert Brett states, in a letter to the Editor of the British Annals of Medicine, the following facts with regard to this article:—

"Whilst examining some of the powder sold in the shops under the name of *Calamine*, I was surprised to find that any of the mineral acids dissolved but only a very small proportion; this was the case even with nitro-hydrochloric acid, a heavy white powder always remaining after the action of the diluted acid, assisted by heat.

1. Some of the powder in question was boiled for half an hour in hydro-chloric acid diluted with an equal bulk of water, taking care that the acid fluid should be in excess. A white, finely divided and very heavy powder remained unacted upon; the whole was then thrown upon a filter, and the insoluble residue well washed with distilled water, until the wash-fluid ceased to be acid; the powder remaining on the filter was allowed to dry, and then examined; it was not soluble in diluted sulphuric, nitric, or hydrochloric acids.

A. A portion was boiled for some time in a considerable quantity of water, and filtered; the aqueous fluid was divided into two portions; to one a solution of chloride of barium was added without producing any alteration, to the other oxalate of ammonia, also without effect; the powder, therefore, did not contain any sulphate of lime.

B. The powder which had been acted upon by distilled water was then boiled for a considerable time with a strong solution of pure carbonate of soda, the whole was then filtered, the clear fluid which came through was supersaturated with nitric acid considerably diluted; the addition of a solution of chloride of barium to this fluid caused an abundant precipitate.

C. The powder remaining on the filter was boiled with an excess of diluted hydrochloric acid, and filtered; the reacting fluid was abundantly and instantly precipitated by diluted sulphuric acid, and the soluble sulphates. The powder, therefore, was sulphate of barytes, and as it was not altered in the colour by hydro-sulphuret of ammonia, it contained no salt of lead.

D. The acid solution (1) struck a deep blue colour with the ferrocyanide of potassium, and yielded a white but scanty precipitate after some time with a solution of sulphate of magnesia; this precipitate, when collected on a filter and washed, was blackened by hydro-sulphuret of ammonia. Ammonia when added in excess to the acid fluid caused a brown coloured precipitate: this, when washed and digested in a solution of caustic potash, yielded a fluid by filtration, which was not altered by the addition of an excess of muriate of ammonia, although much ammonia was evolved.

E. The ammoniacal fluid, when separated from the brown coloured precipitate, was mixed with hydro-sulphuret of ammonia; a slight opalescence was tardily produced. Another portion of the same ammoniacal fluid was treated with oxalate of ammonia; an abundant precipitate ensued.

From these experiments it would appear that the hydro-chloric acid solution contained iron, as shown by experiment D; the absence of alumina was also shown by the same experiment, and the presence of lead.

The existence of iron, and the probable presence of traces of zinc, were shown by experiment E.

Manganese did not appear to be present; for when a portion of the original powder was subjected to the blow-pipe flame with carbonate of soda, the fused mass did not possess any green tinge, so characteristic of manganese even in the smallest quantity.

The powder when acted upon in the first instance by hydro-chloric acid evolved sulphuretted hydrogen. I next ascertained the quantity of sulphate of barytes in six different specimens in the powder called *calamine* with the following results:—

Specimens.

1.	Sulphate of barytes		83	in 100 parts.
2.	"	"	78	——
3.	"	"	87.5	——
4.	"	"	85	——
5.	"	'	81	——
6.	"	"	85	——

The other ingredients did not appear to differ materially in quantity in the different specimens, as far as could be judged of by a qualitative analysis.

The following may be looked upon as the constituents of the powder of the shops, called *calamine.*

Sulphate of barytes.
Oxide of iron.
Carbonate of lime.
Lead (probably sulphate.
Zinc? (mere traces.)

Should the above experiments, to which I shall add no remarks at present, appear of sufficient interest, you will, perhaps, oblige by giving them a place in your journal.

Opiate oil.—(*Oleum opiatum.*)—This preparation is made by digesting at a certain degree of heat, an ounce of crude opium in 16 oz. of oil of henbane, and finally expressing. The difficulty attendant upon mixing the tinctures of opium in use, with fatty substances for external application, has induced M. Neuber to introduce this preparation into practice. It answers well the end for which it is designed, and M. Neuber has already employed it with much success, either alone, or combined with ointments, or with aqua ammoniæ, as volatile liniment.

Pfaff's Mittheilungen, and Jour. de Phar.

Pills and Liniment of Prof. Otto, of Copenhagen, for Ascites.

PILLS :—

℞—Ammoniaci	ʒi.
Ext. taraxaci	
Sapor. venet $\underline{aa}$	ʒij.
Pulv. Scill.	gr. vi.
Pil. hydragyr.	gr. xi.
ℳ—Ol. juniperi	q.s.
Fiant pilulæ no. xviij.	

Dose from 5 to 10 daily.

LINIMENT :—

℞—Tr. sem. colchici.	
digitalis	
scillæ $\underline{aa}$	℥ss.
ℳ—Lin. volat.	℥iss.

To be employed as a friction upon the abdomen and œdematous parts.

Casper's Wochenschrift.

Protoxide of Mercury.—Mialhe states that Donovan has inaccurately stated, that the sub-oxide of mercury may be isolated by means of corrosive sublimate, and an excess of a cold solution of caustic potash. By this process, as by others, metallic mercury is procured, and a corresponding quantity of deutoxide, as Guibourt has proved in his inaugural dissertation. *Bull. Gen. de Therapeutique.*

Hydriodic Acid.—Dr. Andrew Buchanan gives the following formula as that according to which the liquid hydriodic acid is prepared in the Glasgow Royal Infirmary: ℞ Iodidi Potassi, grs. 330, Acid Tartarici, grs. 264.

Solvantur seorsim in Aquæ destillatæ, ℥iss. Misceantur solutiones et

quum subsederit Bitartras Potassæ cola. Colato adde aquæ quantum sufficiat ut sint totius liquoris drachmæ quinquaginta, ʒL.=℥vi. ʒij.

Acidum hoc Hydriodicum liquidum, habet Iodinii, gr. v., in singulis drachmis.

It is a fact well known to physiologists, says Dr. B., that when free iodine is introduced into the stomach, it is speedily converted into hydriodic acid. This conversion is probably effected differently in different cases. If a large quantity of uncombined iodine be swallowed when the stomach is empty, the hydrogen with which it combines may be furnished in part by the gastric juices, but it can scarcely be doubted that it is chiefly supplied from the tissues of the stomach itself, which undergo corrosion. When, however, the iodine is given in combination with starch, it is probable that the starch, while under digestion, furnishes the hydrogen which goes to form the hydriodic acid, and in this way the starch defends the tissues of the stomach from the corrosive action which they would otherwise undergo. It appeared to me, however, that it would be well to save the stomach the labour of preparing the hydriodic acid, by giving, for the purposes of medicine, not free iodine, but the hydriodic acid itself.

I was the more inclined to make this experiment, as it would enable us to determine, from direct evidence, whether the opinion, rendered so probable by general reasoning, be also borne out by experience, that hydriodic acid closely resembles iodine in its effects upon the body, and is in reality the active principle to which the ordinary preparations of iodine owe their medicinal efficacy. The trials made of the hydriodic acid as a medicine fully realized the expectations entertained of it.

The processes recommended in works upon chemistry for forming hydriodic acid are not well adapted for the purposes of medicine, both on account of their complexity, and because they do not yield an acid of which the strength is uniform and easily estimated. The strong mineral acids cannot be employed in decomposing the iodides to form hydriodic acid, as is done in forming muriatic acid from common salt, because those acids react on the hydriodic acid as it is generated. The tartaric acid, however, is not liable to the same objection; and I found on trying the experiment of treating iodide of potassium with tartaric acid, in the proportions necessary to form cream of tartar, that hydriodic acid was readily obtained in a state of sufficient purity for the purposes of medicine, although holding some cream of tartar in solution. To diminish as much as possible the quantity of cream of tartar dissolved, the acids and salts are each dissolved in a very small quantity of water, the rest of the water not being added till the precipitated cream of tartar has been removed by filtering. The liquid acid thus obtained has an agreeable sourness. It is at first limpid, or with only a slight yellow tinge, but as happens to this acid, in whatever way prepared, on being kept it soon assumes first

a wine yellow, and next a beautiful red colour, from a portion of the acid undergoing decomposition, while the iodine disengaged is dissolved in the rest of the acid. It has been ascertained that this process of decomposition may go on till one-half of the acid is decomposed, when the colour of the liquid is a very dark red, approaching to black. The diluted acid, however, prepared as above, may be kept many months without at all approaching this limit.—*London Med. Gaz. and Amer. Jour. of Med. Sci.*

Iodide of Starch.—Dr. Andrew Buchanan, Junior Surgeon to the Glasgow Royal Infirmary, in a communication in the *London Medical Gazette* (July 2, 1836,) extols this preparation of iodine, which he prepares in the following manner:—℞. Iodine gr. xxiv.; Amyli in pulverem tenuissimum triti ℥j. The iodine is first triturated into a little water, and the starch gradually added, the trituration being continued till the compound assumes a uniform blue colour. The iodide is then dried with a heat so gentle as not to drive off the iodine, and it must be afterwards kept in a well stopped bottle. *Ibid.*

Iodine in Minerals and Plants.—Arago stated to the academy that Del Rio had discovered iodine in the horn silver of Albarradon (a district situated in the department Zocateras, Mexico;) that iodine had also been met with in the white lead of the mine of Catorce by M. Bustaments. Lastly, that iodine, which was only supposed to exist in sea plants, has been found in the *sabila* and *romeritos.* The first is a plant of the genus *agava*, which grows in the plains and sides of mountains; the latter a sort of barilla which grows in the floating gardens of the fresh water lakes in the neighbourhood of the town of Mexico. *Journ. de Pharm.*

Crystallized Hydrate of Potash.—The crystallization of hydrate of potash from cold solutions is understood, but the separation of the soft hydrate from caustic potash, melted at a red heat, has been less attended to. Walter digested from 3 to 4 lbs. of melted potash with a little water, allowed the effect of the heat to pass away, added as much water as was sufficient to dissolve the whole, allowed it to stand for 12 hours, and then decanted the solution. The bottom of the vessel was covered with many clear crystals. To preserve these, they must be dropped through a glass funnel into a vessel with a ground stopper, and placed in a cool place. They appear to be acute rhomboids with truncated angles. In vacuo over sulphuric acid they effloresce and become dull. They dissolve in water, producing cold. In the concentrated mineral acid they dissolve with the evolution of heat. In spirit they dissolve without giving out heat. They dissolve in caustic ammonia. By this means bubbles of ammoniacal gas are discharged from the crystals, but which are condensed before they reach the surface of the liquid. The composition was determined by dissolving a portion of the crystals in muriatic acid, evaporating the solu-

tion to dryness, and calculating the composition from the ignited and weighed chloride of potassium. By a mean of two trials, 50.1 per cent. was obtained. Walter considers the formula to be $KO+5HO$, corresponding with 48.9 per cent. of water. The excess of water he considers to be mechanically mixed with the crystals. The crystals dried in vacuo are sulphuric, and contain 21.4 per cent. of water, corresponding to $KO+\frac{1}{2}HO$. Caustic potash melted by a red heat contains 16.05 per cent. of water, and is equivalent to $KO+HO$. *Central-Blatt*, *Aug.* 1836.

Essential Oils. All works on pharmacology agree as to the necessity of lowering the boiling temperature of water in the preparation of certain oils. Mailhe states, that there is no use for this proceeding. He placed an ounce of essence of turpentine in eight ounces of distilled water, and submitted the whole to distillation. When half of the essence was distilled, he placed it in a graduated tube, and marked the quantity of essence obtained. He made a second experiment similar to the first, but with water saturated with common salt. He obtained the same quantity of oil as in the first experiment. This experiment appeared remarkable, until the appearance of the fine experiments of Rudberg.

Journal de Pharmacie.

[The small difference of temperature in these experiments we do not consider sufficient to determine the point. *Ed. British Ann. of Med.*]

Syrups. Some of these are apt to ferment. To prevent it, the boiling syrup should be introduced into hot bottles; the latter then corked, and covered with pitch. When the syrup has cooled, it is to be agitated in order to mix with it the superior portion liquefied by the vapour of the water condensed in the neck of the bottle. It is then to be deposited in a cellar, where it will remain without undergoing any change.

Journal de Pharmacie.

Calomel obtained by Precipitation.—"Calomel thus obtained is very white, and enjoys much more active properties than what is prepared by sublimation, which it owes to its extreme division."—*Henry* and *Guibourt.*

"When the white precipitate is well washed it has absolutely the same composition as calomel; only it retains almost always a little interposed water; it is very active, because it is much divided."—*Soubeiran.*

"The white precipitate is identical with calomel."—*Soubeiran*, *Gay*, *Lussac* and *Thenard.*

"Chloride of mercury thus prepared retains always a little common salt, which cannot be removed by washing. This small quantity is sufficient to give solubility to the chloride, and to communicate to it a very distinct mercurial taste, by changing it partly into mercury and corrosive sublimate; administered internally it excites salivation."—*Dumas.*

"If the liquids are perfectly neutral, at the moment when they are mixed, a subnitrate of mercury is precipitated, which cannot be removed by the most careful washing, and which produces dangerous effects when this preparation is employed internally."—*Berzelius.*

Mialhe has found—

1. That sublimed calomel and white precipitate have no appreciable difference.

2. The solubility of the two chlorides appears the same.

3. The precipitate afforded only traces of chloride of sodium.

4. In two specimens, prepared according to the French *codex*, he detected subnitrate of mercury; but in two other specimens he could find none; of the two latter, one had been prepared by decomposing the nitrate by common salt; and the other, by hydro-chloric acid. In the present case, therefore, a basic nitrate was used. *Journal de Pharmacie.*

On a New Test for Nitric Acid, by J. W. Bailey, Acting Prof. of Chem. &c., U. S. Military Academy. Chemical reagents may be divided into two classes; first, those which produce with the substance they are employed to detect, an action which they will produce with no other known body; an example is starch, as a test for free iodine: secondly, those which cause a certain action with a *small number* of bodies, which they will not exhibit with any others; as, for example, sulphuretted hydrogen, which causes a black precipitate with a *few* metals.

The first class are, of course, the most valuable reagents, as they require no subsequent operation to determine whether certain substances are present or not; while with those of the second class, we only determine that one of a certain number of bodies must be present, but must then resort to other means to ascertain which particular one it may be.

There are many cases, however, when we may know that only one of those bodies which are capable of giving similar results with the reagent added is present, and then if this result *is* produced, the evidence is as satisfactory as can be desired.

The test which I would propose, must be placed among those of the second class, and is therefore inferior in value to morphia as a reagent for nitric acid; but I think it *at least* as valuable as the method by means of gold leaf and hydrochloric acid, or by the bleaching of indigo.

The substance I now suggest, as a new reagent for nitric acid, is the cyano-hydrargyrate of iodide of potassium, discovered by M. Calliot. It is formed by mixing together bicyanuret of mercury and iodide of potassium, (one equivalent of each,) dissolved in small quantities of warm water. It soon crystallizes in a very beautiful manner. This is the same salt which has recently been recommended as a means of detecting the presence of hydrochloric acid in hydrocyanic acid. (See Lond. and Ed. Phil. Mag. Nov. 1835.)

Its use as a test for nitric acid depends upon the fact, that if one of the scale-like crystals be introduced into *most* acids, it immediately becomes

of a beautiful *red*, being changed into the bi-iodide of mercury; while in *concentrated* nitric acid, (spec. grav. 1.4 to 1.5,) the scale instantly becomes almost black, from the liberation of iodine. A scale of the salt introduced into a drop of the acid no larger than a pin's head will show the effect distinctly.

The acids in which I have found the salt to *redden* are, sulphuric, hydrochloric, hydrofluoric, chromic, phosphoric, (if slightly diluted,) and the common vegetable acids, such as oxalic, tartaric, citric and acetic acids.

I have found it to blacken with chlorine gas, solution of chloride, (recently prepared,) bromine, sulphuretted hydrogen, nitrous acid vapours, and *nitric acid.*

It is highly probable, that it would be blackened by bromic acid and chloric acid, and possibly by iodic acid, but I have not at present these acids in a free state to determine their action; the method, however, in which I use the test will prevent any fallacy from the presence of chloric, bromic, iodic or chromic acids, and of sulphuretted hydrogen. It is to evaporate the supposed nitrate to dryness, and introduce into a tube retort a small portion of the salt, on which a few drops of sulphuric acid are to be poured; then on applying moderate heat, by means of a spirit lamp a portion of the volatile products are to be driven over into the receiver, in which a few scales of the salt are previously placed. If these are blackened, the salt is to be considered as a nitrate, provided the presence of those few substances which might cause the same result has been guarded against. Now by the very method proposed, viz., evaporating to dryness and adding sulphuric acid, the presence or absence of chromic, chloric or iodic acid and sulphuretted hydrogen, will be determined; for the colour of a chromate, the evolution of per-oxide of chlorine from a chlorate, the liberation of iodine from an iodate, and the odour from a sulphuret, will at once decide with regard to each. As iodic and bromic acids, even if they are found to blacken the salt, are not sufficiently volatile to be driven over by the heat to be employed, no error could arise from their presence.

I have observed, that if the salt used above, or the bi-iodide of mercury itself, be introduced into a test tube, with strong sulphuric acid, on adding a concentrated solution of any nitrate, (except those of silver and mercury,) the red colour of the scale or bi-iodide will speedily disappear, and will be followed by the dark hue of iodine. Even when the sulphuric acid forms an insoluble precipitate, the action may be seen, by stirring up the precipitate with a glass rod, when the dark spots will be easily observed.

This method of testing may sometimes be used, but is liable to the objection that a chromate, chlorate, and probably some other salts, would give the same result. It is greatly inferior to the method by distillation, as given above. *The American Journal of Science and Arts.*

CONTENTS.

ORIGINAL COMMUNICATIONS.

SELECTED ARTICLES.

CONTENTS.

MISCELLANY.

Table 16

LOBELIA INFLATA

☞ *This plate was designed to accompany the article on Lobelia inflata, in the last number of the Journal, but from a misunderstanding was procured too late to be issued with that article.*

THE

AMERICAN JOURNAL

OF

PHARMACY.

OCTOBER, 1837.

ORIGINAL COMMUNICATIONS.

ART. XXVII.—ON VERATRUM VIRIDE. By Thos. R. Mitchell.

(Extracted from an Inaugural Essay.)

EXPERIMENTS.

The decoction, which was of a slight red colour, and somewhat mucilaginous appearance, formed precipitates with subacetate of lead in solution, with a persalt of iron, and alcohol. Alcohol also rendered it turbid, indicating the presence of gum; the taste was nauseous and slightly bitter. The decoction and tincture both redden litmus paper, and have their colour deepened on the addition of an alkali. With iodine the decoction struck a blue colour. There is a red colouring principle contained in this root which is taken up by alcohol; less so by ether, and still less by water.

An alcoholic tincture was made by digesting ℥j. of the bruised root, for four days, in ℥ij. of alcohol. This tincture was of a beautiful red or wine colour, and bitter taste. This was filtered, and the clear liquid evaporated. The extract thus obtained was of a reddish brown colour, even resinous fracture, and when chewed, left a very acrimonious taste on the mouth, which lasted for two or three hours. It resembled burnt sugar in smell, and, when first taken into the mouth, resembled that substance in taste.

This extract was dissolved in alcohol and boiled with a

small portion of animal charcoal, filtered while hot, and on evaporation yielded a substance somewhat lighter in appearance, irregular in shape, interspersed with numerous small, shining crystals. It had lost its sweet taste, but retained its bitter one; was soluble in water and nitric acid, and insoluble in ether.

A portion of the bruised root was digested for three days in ether. The tincture was slightly tinged with a red colour, possessing little of the bitter taste imparted to alcohol and water. The colour was deepened on the addition of an alkali. On evaporating this tincture, a substance adhered to the sides of the vessel of a red colour, somewhat unctuous to the fingers, insoluble in alcohol and water, but soluble in ether and a solution of carbonate of potassa.

A decoction was made by boiling for fifteen minutes ℥iv. of the root in cong. ss. of water; this was filtered, and a solution of subacetate of lead gradually added as long as any precipitate was formed. A stream of sulphuretted hydrogen was transmitted through the liquid, after filtration, to get rid of the excess of acetate of lead. The liquid was again filtered to remove the excess of sulphuret of lead; it was next concentrated by a gentle heat, and boiled with a small quantity of carbonate of magnesia; filtered, and the residue on the filter edulcorated with cold water; after the magnesia had subsided, the clear liquid was poured off and treated with boiling alcohol. The liquid was evaporated, and a very minute quantity of a slight brown or grayish substance was obtained. This was exceedingly bitter, and half a grain produced a very great desire to vomit, which lasted for an hour. Owing to the very small quantity obtained, I was unable to experiment or ascertain its precise nature. It was reddened by the action of nitric acid, and I am of the opinion that it was the active proximate principle.

From these few experiments, I concluded that there exist in this plant, 1. gum; 2. resin; 3. starch; 4. red colouring matter; 5. wax; 6. sugar; 7. a bitter proximate principle, supposed to be analogous to Veratria; 8. gallic acid, combined with the preceding.

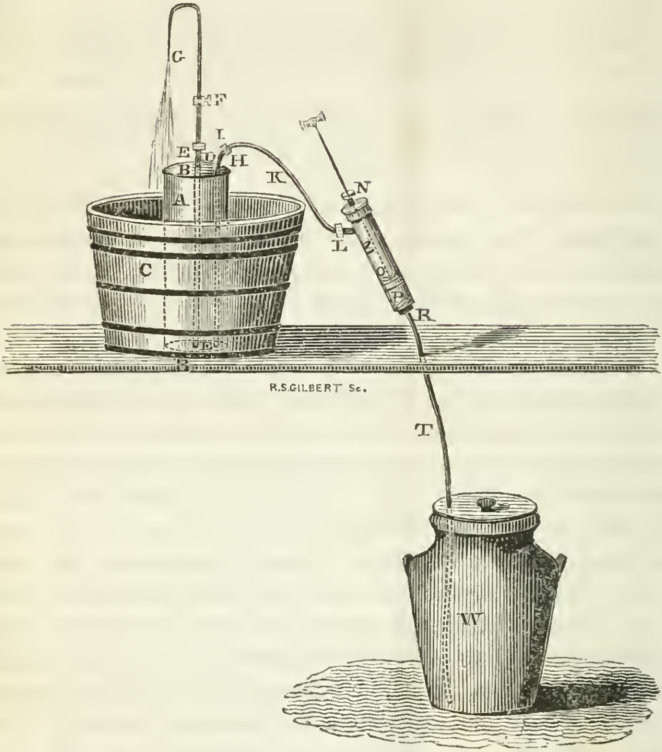
ART. XXVIII.—DESCRIPTION OF SWAN'S ATMOSPHERIC SODA FOUNTAIN.

Extract of a letter from L. B. Swan, Esq., to a member of the Publishing Committee.

"With this I take the liberty of sending you a drawing and description of an apparatus for making soda water, which I have used successfully in my establishment for three years past, and it is now employed by several druggists in this part of the state.

It makes no pretensions to improve the medicinal properties of soda water, but I have found it to answer the purpose well in the formation of this beverage, which in fact gives better satisfaction than the water from any of the fountains on the old plan which are in use here. I was led to make the experiment by the fact, that in small cities, like ours, and in large towns, it is almost impossible, with the amount of the business we have, to make soda water profitable, and even to make it pay its own expenses, owing to the original expense of an apparatus and the keeping it in operation. You will readily perceive the economy of the fountain, as the original cost is but about $30, and the trouble and expense but trifling in comparison with the old process; the difficulty from the fermentation of syrup during the warm season being also entirely obviated by the tartaric acid. However, as I wish to have the thing stand upon its own merits, I will say no more in commendation. I send the drawing and description for your inspection, and such other gentlemen of the College of Pharmacy to whom you may choose to submit it, and shall consider it a favour if, after examining, you will say what you think of it. I might send the certificates of respectable medical and scientific gentlemen who have examined it, but as my only object is to introduce it to your notice I will not trouble you further.

Rochester, August 10th, 1837."



A. represents the fountain, which is a cylinder, or air-vessel, of copper, about 24 inches in length and 10 inches diameter, with convex heads, B B., the inner surface being thoroughly coated with tin.

D. A tube of lead or tin, about three-eighths of an inch in diameter, passing through the centre of one of the heads of the air-vessel, descending to the bottom, and open at the ends E E, into which a stop-cock F is inserted, and a discharging pipe attached with an orifice $\frac{3}{32}$ of an inch in diameter G.

H. Another tube of similar dimensions passing through the margin of the same head, and in like manner open at the ends.

I. A valve at the upper termination of the pipe H, opening downwards.

K. A lead pipe connecting the pipe H. with the discharging aperture L. of a forcing pump M. The cylinder of the pump is constructed of a composition of lead and tin or other suitable material, about $\frac{1}{4}$ of an inch in thickness, two inches in diameter and 12 inches in length, with brass cap and boxes, a packing box N. at the top around the piston rod, a valve O. in the piston opening upwards, and a valve P. in the bottom box R. opening in the same direction.

T. A lead pipe attached to the lower box R. and passing into the reservoir W. placed in the cellar, or at a convenient distance in any other situation. The reservoir is a stone ware jar of sufficient dimensions to contain about 12 gallons.

C. The ice tub, in which the fountain is placed and secured; the divided half of a barrel will answer the purpose and is of a suitable size.

The couplers connecting the pipes, as represented in the drawing, are of brass, of the ordinary kind, accurately fitted.

The stop-cock is also brass, very nicely adjusted, and may be inserted in the pipe below or above the counter.

The pump is secured by being firmly soldered to a metallic plate, and the plate fastened by screws to a plank placed perpendicular, so that the position of the pump may be at a convenient angle for working, the plank secured at the top to the counter, and at the bottom to the floor.

It will be perceived that the whole apparatus must be made in the very best manner, and nicely adjusted, as it is required to sustain a considerable degree of atmospheric pressure.

The dimensions of the fountain and reservoir may be with propriety increased. However, those given will generally be found sufficient.

Manner of using the Fountain.

Prepare any of the varieties of syrup in the usual manner, and dissolve in each gallon of the same 7 ounces of tartaric acid; put into the reservoir any quantity of pure water which

it will contain, and dissolve in each gallon one ounce of super-carbonate of soda; apply the handle to the pump, and, after forcing into the fountain a sufficient quantity of the solution of super-carbonate of soda from the reservoir to procure as rapid a discharge as is desired, pour into a half pint tumbler about one fluid ounce of the syrup prepared as above, and open the stop-cock until the tumbler is filled.

For soda water without syrup, dissolve 8 ounces of tartaric acid in one gallon of pure water, and use in the same manner and in like quantity as the syrup.

ART. XXIX.—NOTE UPON VERATRIA, AND ITS USES.

By Augustine Duhamel.

The now extensive use of this vegetable alkaloid, and the limited knowledge of the manner it is employed in medical dispensation, from there being no published formula of its preparations, presents an inducement to give a few details in relation to it.

It is believed to have been first used in this city by Dr. S. Jackson, for whom some was imported by Mr. Durand, a few years ago, when but little known here, and then only recently introduced in medical practice in Europe. Its effects were tried in neuralgic affections by Dr. Jackson, and with signal success; so much so as to oblige his constant recurrence to it in similar cases.

For the discovery of Veratria we are indebted to those indefatigable chemists, Pelletier and Caventou, the pioneers of a new branch of Chemistry, whose labours in this department of science were rewarded by the great discoveries of Quinine, Strychnine, Brucine, and other proximate elementary substances of vegetables; by them a wide field has been opened for future investigation to the lover of Chemistry.

In 1819 these gentlemen detected Veratria in the Veratrum Sabadilla, Veratrum Album, and the Colchicum. The following is the mode commonly pursued to obtain this substance.

Boil the seed of the Veratrum Sabadilla with water; when, by repeated decoctions, all the soluble active matter is extracted, evaporate to diminish its volume. Treat this liquid with a solution of acetate of lead until it ceases to furnish a precipitate. Filter and pass through the liquid a current of hydrosulphuric acid gas—which will precipitate the excess of lead in the form of sulphuret. Then expose to heat to drive off the excess of acid, and having again filtered it, boil with an excess of magnesia. In this manner the acetate of veratria is decomposed, and the veratria precipitated with the excess of magnesia. The precipitate is then collected upon a filter, washed with cold water and dried; it is afterwards powdered, treated with boiling alcohol and animal charcoal, then filtered, and, lastly, abandoned to spontaneous evaporation, which leaves the Veratria in the form of a white powder.

Veratria is of a dull white colour, but generally grayish as brought from the laboratories. It is pulverulent and inodorous; but so extremely acrid, that the smallest particle of this subtile powder coming in contact with the nostril excites violent sneezing, which lasts for some time. It has a very acrid taste, without any bitterness. It is sparingly soluble in water, very soluble in alcohol, but less so in ether. It restores litmus reddened by an acid. It forms salts with the acids, but only one of which is crystallizable—the sulphate—and that only partially. With the other acids an uncrystallizable mass is formed resembling gum.

The product is not abundant; on the contrary, so little does the V. Sabadilla yield, although furnishing more than the other varieties of this plant, and the operation being attended with considerable trouble, as to make it costly—so much so, as to expose the article to sophistication. This makes it very necessary to exercise some caution in its selection.

A fraud of the kind, practised upon our druggists about two

years ago, led to the disparagement of this active substance. It was furnished to a number of physicians, about making their first essay upon the power of Veratria, and it proving comparatively innocent disappointed their expectations. The imported article, bearing the label and seal of well known French houses, may be relied upon as good. It is made here of good quality by Mr. DENIS, operative chemist, formerly attached to the laboratory of ROBIQUET, and now in the employ of Mr. ROSENGARTEN of this city.

Veratria exerts a special action upon the nervous system. It is most commonly employed as a local application in Tic Douloureaux and Neuralgia. It is in nervous headache when thus applied that it has been most successful, affording almost instantaneous relief.

For external use, the most common form in which it is prescribed is this:

℞. Veratriæ, gr. j.
Cerati. Simp., ʒj.
M.

A small portion of this is rubbed with the end of the finger upon the part affected.

It is occasionally directed to be made as strong as four grains to the drachm. Sometimes simple lard is preferred to the Cerate; but for frictions the best medium by which to convey Veratria by absorption through the skin is the oil of laurel,—the fine green concrete oil of the Laurus Nobilis,—in which it is soluble, forming with it a liniment of fine colour and agreeable odour. So powerful a sternutatory is it, that some delicacy is enjoined upon the person manipulating with it to guard against its effects.

It is administered internally in substance and in the form of tincture. The tincture is given in the dose of 5, 10 or more drops, and is thus made:

℞. Veratriæ, gr. j.
Alcoholis rect., ℥j.
M.

In substance it is given in the dose of $\frac{1}{12}$th and $\frac{1}{8}$th of a

grain in conjunction with some inert body, or combined with the extracts of lettuce, hyosciamus, or belladonna. Its effects, when taken internally, have been asserted to be those of a a drastic purgative; but these have not been fully realized. In large doses tetanus is the consequence, followed by death.

ART. XXX.—ON NEUTRAL MIXTURE. By JOHN GOODYEAR.

(Extracted from an Inaugural Thesis.)

SOME two or three years since, an article was published in the Journal of the Philadelphia College of Pharmacy, of which Mr. JOSEPH SCATTERGOOD was the author, on the subject of Neutral Mixture. The object of the author seemed to be to expose the great diversity then, and still, existing in the prescriptions of physicians for that remedy, when their object was, and is, in the majority of cases, to use a medicine of uniform strength; and to propose a form or forms which would meet the views of practitioners in general, and render it specific in its composition, and essentially the same. A single glance at the prescriptions cited by him as of every day occurrence, is sufficient to convince any person who has the least knowledge of medicine, that there is not only great room for improvement, but great need of it. The object of the author seemed to be, also, to induce physicians to substitute for the ordinary prescription of lemon juice and the carbonate of potassa, the citrate of potassa, as prepared by the manufacturing chemist, dissolved in water. This, with something to render it pleasant, would no doubt be a good substitute; and, taking into consideration that prescriptions are not always compounded by the most skilful and experienced pharmaceutists, would probably be the best form of administering this remedy. But doubts exist whether or not it makes so desirable a preparation as the recent lemon juice

and the carbonate of potassa, when these are prescribed and compounded with judgment and care. In consequence of the great length of time since this remedy was introduced into medical practice, and the great benefits arising from its use, it is not probable that physicians generally will be easily persuaded to forsake the old form, and adopt in its stead any substitute.

Under such circumstances, it would probably be best to suggest such modifications of the old form as would be likely to meet the views of those who are partial to it, and render it (as Mr. SCATTERGOOD truly says) "what all admit it is not now,—of uniform strength." It will be the object of the writer in the subsequent part of this essay to show how far this end, so desirable, can be attained. Saline, or Neutral Mixture, as it is now indiscriminately called, has been in use as a therapeutic agent for more than a century. It was originally prescribed in the form of the modern Effervescing Draught; the impure corbonate of potassa, then known as the Sal Absinthii, being employed, instead of the Alkaline Salts now used. As a general rule, the alkali was not used in larger proportion than from ℈i. to ʒss. to the ounce of lemon juice, being a much smaller quantity than is necessary to saturate it, as will hereafter be shown.

Of late years, this remedy has risen high in the estimation of both European and American practitioners. In consequence of the difficulty of procuring lemons in the interior of this country, the use of this preparation is confined almost exclusively to the Atlantic cities. As in some seasons of the year no prescriptions are so common as those for Neutral Mixture, perhaps no one has so good an opportunity of judging of the superiority of some, and of the inferiority of other forms, as the apothecary. It is often the case that the physician leaves it entirely to the discretion of the apothecary to select a form, by writing his prescription thus

℞. Misturæ Neutralis, ***.

Perhaps, having been acquainted with the form used in one

store, he is under the impression that all others use the same, under like circumstances; and we have no doubt that greater diversity arises from this than from any other cause; for it may be said with truth, that there are almost as many different forms in use as there are stores in which this medicine is prepared. Not long since, a physician complained, that, having prescribed Neutral Mixture for his patient, the prescription was taken to a respectable apothecary to be compounded, and being under the impression that the medicine was one of the most pleasant, (and probably having told his patient so) he was astonished to hear, on his next visit, that the medicine was very unpleasant; and on examination found, that to a quantity of (what probably was) lemon juice, so much potassa had been added as to render it of a dark brown colour, and of a bitter, strongly alkaline taste. Another physician, a few days since, requested that a prescription he had given for Neutral Mixture should be repeated, and the tartar emetic in it omitted. On being informed that it contained none of that salt, and that it was not customary with us to use it, except when specially prescribed, he replied, that he was under the impression that it was prepared always according to the recipe in Ellis' Formulary (which contains tartar emetic in the proportion of one grain to f. ℥ivss.) If any thing more is necessary to show that great misunderstanding exists as to the ingredients of this medicine, perhaps it would be proper to state, that in most cases lemon juice is used; often citrate of potassa, and sometimes citric acid. Sugar is used in the proportion of from ʒi. to ℥ss. to f. ℥iv., and not unfrequently sweet spirits of nitre, in the same proportion; so that in every instance the sensible properties at least vary much. Copies of only a few original prescriptions would be necessary to show that there is as much difference in the prescriptions of physicians, as there is in the forms of apothecaries.

For copies of some of these we would refer the reader to Mr. Scattergood's paper in the 5th vol. of the Journal of the Philadelphia College of Pharmacy, page 16.

Some physicians prescribe the bicarbonate of potassa, instead of the common salt of tartar. It does not much alter the character of the medicine; but is to be preferred as making a much nicer preparation. The salt of tartar always contains silica; and when used in this preparation, the silica exists in the form of a flocculent precipitate. This precipitate, though entirely inert, might as well be avoided, when it can be so easily done. Neutral Mixture is preferred by some practitioners in the form of the Effervescing Draught For this, the bicarbonate of potassa is certainly to be preferred, as it seems that not only the agency of the citrate of potassa is desired, but likewise that of the carbonic acid gas, which is disengaged during the action of the acid on the alkali. The reason why the bicarbonate is to be preferred in this case is very evident. The following prescriptions for the Effervescing Draught are common.

℞. Potassæ bicarb. ʒiij.
Aquæ, ℥iij.

Liqua.

Sig. Half a table spoon full with as much lemon juice in the state of effervescence.

℞. Potassæ bicarb. ʒiij.
Aquæ, ℥iv.

Liqua.

Sig. A table spoon full with as much lemon juice in the state of effervescence.

℞. Sal. Tart. ʒij.
Aquæ, ℥iv.

The dose of this is the same as that of the last prescription. It will not be very difficult to discover the disparity existing between these. Having shown the great want of uniformity in this preparation, we will proceed to state a few facts furnished by actual experiment. Lemons yield from f. ʒiij. to f. ℥iss. of juice. We have been sometimes disposed to think,

from observation, that when a lemon has been exposed in a dry situation, until the skin becomes partially dried, it affords a considerably larger portion of juice than it would have done in its recent state. Could this be proved by experiment, we should try it. It is said by some that the quantity of citric acid in lemon juice varies as much as from 20 to 30 per cent. Whether or not they had particular reference to the imported lemon juice we cannot say; but judging from the various reports of the manufacturing chemists, we should say they had. We have found by experiment that the recent juice also varies considerably in the quantity of acid it contains, and that it varies just in proportion as the fruit becomes drier, until decomposition commences; and we may add, just in proportion as the mucilaginous and saccharine matter seems to decrease. To try this experiment, three sorts of lemons were selected. The first were fresh. To saturate an ounce of juice expressed from these it required ℈ij. of the carbonate of potassa. The second had been rolled separately in paper, and kept in a dry situation for about a month, so that their original dimensions were considerably reduced, but they retained their natural colour, odour, &c. To saturate an ounce of the juice furnished by these, about 46 grains of the carbonate of potassa were necessary. The third were such as had by time and exposure become almost brown, and hard externally. An ounce of juice expressed from these, required 50 grains of the carbonate of potassa to saturate it. Under such circumstances as those just related, the bicarbonate of potassa was used, and we found in the several instances from $\frac{1}{4}$ to $\frac{1}{3}$ more of it to be necessary. We have already suggested the propriety of using the bicarbonate instead of the regular carbonate of potassa for making the Neutral Mixture, but since experimenting we have thought it immaterial which was used. The object of using the bicarbonate instead of the regular carbonate was to get rid of the precipitated silica, but as the mixture is opaque made with either, a preference would be useless. From what we have learned by experiment and otherwise, we are induced to think that in every instance it

would be better to prescribe the alkali in definite quantities, and to use them in such proportions that they will certainly be neutralized; for an excess renders the preparation very unpleasant, and we are informed that if an excess of either the acid or the alkali exists, the former would be much preferred. We would recommend the addition of sugar in every instance where the condition of the patient does not contra-indicate its use; of course the physician only can judge of this. The following form is essentially the same as that officinal in some of the foreign Pharmacopœias for making the simple Neutral Mixture, and is probably the best.

℞. Suc. Limon. recent.	℥iij.
Potassæ carb.	ʒij.
Misce et adde,	
Aquæ fluvial.	℥iij.
Sacchar. alb.	℥ss.

By following this prescription the alkali will always be saturated, and should there be an excess of the acid, no evil consequences can arise from it. There is also an officinal Compound Neutral Mixture which differs from the simple, principally in containing the antimonii et potassæ tartras. Should the physician wish to add either this salt or the spiritus nitri dulcis, it would be an easy matter to give directions to that effect. To those who prefer using the citrate of potassa, we would recommend the following form:

℞. Potassæ citrat.	ʒiv.
Aquæ fluvial.	℥vi.
Liqua. Dein adde	
Sacchar. alb.	℥ss.
Acaciæ gummi pulv.	ʒij.
Ol. Limonis,	gtt. iij.
Misce.	

The object in adding the gum, is, to make the preparation resemble, as much as possible, that made from fresh lemon juice, the mucilage in which contributes much to render it pleasant.

It is but seldom that the citric acid is directed to be used; but when it is, the following form would be proper:

℞. Potassæ bicarb.	ʒiij.
Acidi citrici,	ʒiss.
Aquæ fluvial.	ʒvi.

Liqua. Dein adde.

Sacchar. alb.	℥ss.
Acaciæ pulv.	ʒij.
Ol. Limonis,	gtt. iij.

For the Effervescing Draught the following form would be proper:

℞. Potassæ carb.	ʒij.
Sacchar. alb.	℥ss.
Aquæ fluvial.	℥iij.

Liqua.

To be used in such quantity as the physician may direct, with an equal portion of fresh lemon juice.

But if a solution of citric acid would be preferred, the following forms would be proper:

℞. Potassæ bicarb.	ʒiij.
Sacchar. alb.	℥ss.
Pulv. Acaciæ,	ʒj.
Ol. Limonis,	gtt. iij.
Aquæ fluvial.	℥iij.

M. ft.

℞. Acidi Citrici,	ʒiss.
Aquæ fluvial.	℥iij.

Liqua.

These are to be kept in separate bottles, and used in equal portions, as may be directed.

It would probably be better not to add more than one drachm of gum arabic, because if too much mucilage be pre-

sent, too much of the carbonic acid gas will be retained, and it will be necessary to change wine glasses, which are generally used, and certainly most convenient, for larger vessels.

ART. XXXI.—MEDICO-BOTANICAL NOTICES.

No. XIII.

Coptis Teeta. Under this name a plant has been described by Dr. WALLICH, the root of which is medicinal in its properties. The root constitutes a drug known among the Mishmees and Lamas in the mountainous regions bordering upon Upper Assam, by the name, *Mishme Teeta*, by the Chinese it is called *Honglane;* among these three nations it is in great estimation, and in universal use as a powerful tonic and stomachic. It was first brought before the notice of the author by Captain JENKINS, agent to the Governor General on the North Eastern frontiers of Bengal, who transmitted to him a small supply of it; the plant, itself, was afterwards procured for him by Lieutenant CHARLTON, in a live state. "Quantities are sent down to Assam in neat little baskets, with open meshes, made of narrow slips of ratan, or some such material, and measuring three to four inches in length, by two and a half in breadth and one and a half in width. Each basket contains about an ounce of small pieces of the root, from one to three inches long; they are nearly cylindric, uneven, scabrous, more or less curved, of a grayish brown colour, varying in thickness from the size of a crow quill to double that diameter. The root is perfectly dry and brittle; occasionally a few fibrillæ are issuing from one end; the inside is hard, somewhat cellular, the outside of a dingy yellow colour. The taste is intensely and purely bitter, very lasting

and with only a very slight aroma; on mastication the root tinges the saliva yellow, its interior is bright yellow, or gold coloured. It possesses no smell whatever.

Coptis belongs to the sub-division of *Ranunculaceæ*, called *Helleboreæ*.

Coptis Teeta; leaves three-cleft, segments petiolate, pinnatifidly lobed, lobes deeply and very acutely and setaceously serrate, scape few flowered, bracts foliaceous, linearly three parted. Root sub-carnose, much divided, fibrillous, within of a yellow golden colour. Stalk * * *? Leaves erect, glabrous, longly petiolate, texture firm and rigid, resembling, in habit, the frond of a dorsiferous fern, ovate cordate, attenuately accuminate, four inches long, segments supported by a partial petiole half an inch long,—lateral ones semi-cordate ovate, externally almost biparted, two inches long; intermediate one twice as large, a little longer than the petiole, attenuate towards the point, cuneate, sub-decurrent at base: all incisely pinnatifid, lobes obtuse, with broadish serratures terminated with setæ, reticulated, superior nerves pubescent, inferior veins tortuously forked. Petiole slender, as long as the leaf, dilated at base. Scape round, erect, delicate, a little striate, as long as the leaf, bearing three flowers at its apex, (rarely more,) which are small, alternate and pedunculate. Sepals oblong, lanceolate, attenuate, acute, whitish, parallelly veined, glabrous, as long as the claw, fugaceous. Petals linear ligulate obtuse, one-third the length of the sepals, flattish ? Stamens and pistils many ; anthers plano-rotund, whitish. Immature carpels membranaceous, containing from three to five ovules, shortly stipitate and terminated by a sub-cylindrical fleshy style, as long as the carpel, and declinate, stigma within scabrous. Bracts under each peduncle foliaceous, narrow linear, with setaceous serratures on the margin, below three parted. Peduncles elongated.

There are only three species of Coptis, viz:—C. trifolia, C. asplenifolia, and the present; the last bears greater resemblance to the first, which affords the drug, commonly known as "Gold Thread."

The Mishme Teeta has been experimented upon by the late W. Twining, Esq., of the Bengal Service. The following is the report he gives of it:—"The powder of this root is of an intensely bitter taste, which is accompanied with a slight degree of a peculiar aroma. The sensation produced in the mouth subsides but slowly, and is more pleasant than any simple bitter. Judging from the taste, it does not possess much astringency; and this opinion is confirmed, by finding that neither the tincture nor the infusion is much affected by the solution of sulphate of iron. Four hundred and eighty grains of the root, when coarsely powdered and macerated in proof spirit for five days, were found to have lost one hundred and eighty grains. The residue of the above tincture, when dried, amounting to three hundred grains, was macerated for thirty hours in distilled water, and only twenty-six grains were found soluble in water; as the residuum when dried weighed one hundred and ninety-four grains. The maceration in water was not continued longer than thirty hours, because fermentation had commenced, the weather being very hot at the latter end of May.

"If we may be allowed to pronounce an opinion after trying the effects of the powder and of the tincture in seventeen persons, this medicine is highly deserving of attention. The persons on whom the trials were made, were chiefly patients who were suffering from degrees of debility, after the subsidence of acute chronic diseases, and one was a patient who was of a scrofulous habit, and reduced to the lowest stage of debility, by external suppuration of great extent. The effects of this medicine as a bitter, and its influence in restoring appetite and increasing the digestive powers, are very remarkable, and it may be said to possess all the properties of our best bitter tonics. It has seldom appeared to have the effect of constipating the bowels; but in this, and many other respects, I consider further trials necessary to ascertain fully the medicinal properties of this drug."

Pucha Pat. This name is given to a drug which Dr.

WALLICH supposes to be derived from *Marrubium odoratissimum.* It is very common in the bazars of Hindustan, and is imported by Mogul merchants. It is used as an ingredient in tobacco for smoking and for scenting the hair of women, and the essential oil is in common use for imparting the peculiar fragrance of the leaf to clothes among the superior classes of natives. In addition to the above particulars, the following account of the plant is given by Dr. WALLICH; it was obtained from Mr. GEORGE PORTER of Penang. The Pucha Pat plant is evidently of the family of Labiatæ. It forms a shrub of two or three feet in height. The obtusely four cornered branches, and the leaves, are juicy and somewhat fleshy and covered, especially the inferior surface of the latter, with a great deal of soft pallid pubescence, which gives the plant a grayish appearance. All the young parts are densely villous. The leaves are opposite, petioled, ovate, obtuse, grossly and obtusely lobate, crenate, measuring from two to four inches; the lowermost on the branches are sub-cordate, all the others are cuneate and entire at the base; the upper surface slightly rugose; under surface pallid, with very thick rib and nerves, and largely reticulated veins.

Alhagi Maurorum. This plant is a very spiny under shrub, growing in Egypt, Syria, Mesopotamia, Antolia, &c. It is the Hedysarum Alhagi, L., and was discovered and described by RAUWOLF, in 1637. TOURNEFORT found it in the Island of Tinas in 1700. The stems of this vegetable afford an excretion, of a sweet sugary nature, called Persian Manna, much used in Persia, and sometimes in Bengal. According to TOURNEFORT, it is more especially around Tauris, a city of Persia, that it is collected. During very hot weather, there is perceived upon the leaves and branches, an exudation resembling drops of honey, which harden into grains; the largest of which equal coriander seeds; of these, reddish cakes—approaching to brown—are formed, full of dust and leaves, which alter their colour and perhaps diminish their virtue. It is pretended that it is necessary to collect the grains before the

rising of the sun, because they are melted by its action. The dose, as a purge, is about three ounces, mixed with an infusion of senna as ordinary manna. This article is also used as an aliment. M. HALIE, in the article Agul, in the part *Medicine* of the Encyclopedie Methodique I. 397, believes that the manna obtained from the Alhagi, is the substance upon which the Hebrews were nourished in the desert, but this is only one of innumerable conjectures as to the source of that supply of nutriment.

Alhagi Maurorum belongs to class Diadelphia, order Decandria, L., and to the family Leguminosæ of DECANDOLLE. In altitude it varies from two to three, or four feet; the stem is shrubby; leaves simple, obovate, oblong, with minute stipules. The flowers are purple in the middle, reddish about the edges and disposed in racemes along the peduncles. The calyx is five toothed, bell-shaped; corolla papilionaceous, with the petals almost equal in length, the vexillum obovate and complicated, the keel straight, obtuse, and the alæ rounded at the apex. The stamens are ten in number, united into two sets, ovary linear; style filiform, acute. The seed vessel is a roundish, slightly uneven legume, which is rather woody, staked, few seeded and without joints. Seeds kidney shaped.

J. C.

SELECTED ARTICLES.

ART. XXXII.—REPORT UPON A FORMULA FOR VESICATING TAFFETAS. Addressed to the Societie de Pharmacie, by M. DESCHAMPS. By CAP & SOUBEIRAN.

(*Translated by Augustine Duhamel.*)

IN the Codex is found a formula for blistering taffetas given by M. Guilbert, in which are introduced garou or *sain bois* (Daphne Gnidium,) cantharides, euphorbium and myrrh. All these matters are treated by ebullition in water, and the liquid resulting is concentrated and spread upon the silk by means of a brush. Few have adopted this formula, as the taffetas easily peel off soon after preparation. It might also be said that the menstruum had not been well chosen. In 1818 M. Drouot published a more satisfactory one; it is composed of a mixture of tinctures of garou and cantharides—made both with acetic ether; a little colophony is dissolved in the mixture and then applied with a brush upon gummed taffetas. The excellence of the formula has been proved by the Editors of the Journal de Pharmacie; they had to find fault only with the employment of acetic ether—which does not give more advantageous results than sulphuric ether and costs much more.

We shall say as much in reproach of the formula which consists in dissolving the colophony in acetic ether, and mixing the cantharides in fine powder with this tincture; moreover, the powdered flies scattered upon the surface of these

taffetas, give them an unfavourable appearance to the eye. The formula proposed by M. Deschamps, is the following :

Take of	Cantharides in powder,	10 ounces,
	Euphorbium in powder,	1 "
	Alcohol of 35° B.,	2 lbs.

Introduce the matters into a matrass, heat by means of a water bath in a manner to boil the alcohol,—allow to cool, decant, filter, and add to the residuum

Alcohol of 35°,	1 lb.

Operate in like manner; mix the alcoholic tinctures together, and distil so as to obtain 2lb. 8oz. of alcohol; then—

Ichthyocolla,	7 drachms,
Water,	q. s. to make it swell;

The next day employ heat to dissolve it: strain, and mix with the residue of the solution; evaporate so as to have 12 ounces of liquid, and spread with a brush.

Let each layer dry, and give the last coating with a tincture made of one part of benzoin and three of alcohol of 35°.

It is sufficient to wet the skin with cold water when you wish to apply these taffetas.

The waxed taffetas may be replaced with white skin, but before applying the vesicating matter, it is necessary to give to the skin a coating of the following liquid:

Take of	Lampblack,	1 drachm,
	Gelatine,	2 drachms,
	Water,	1½ ounce.

M. Thierry has communicated a formula analogous to the preceding, and which he has always used with success; it is this:

Take of	Euphorbium,	q. v.
	Alcohol of 32°,	q. s.

Make a saturated tincture; spread successive coats upon wax-

ed linen, taking care to let each one dry, before applying another; then—

Balsam tolu,	1 part,
Powdered cantharides,	2 parts,
Sulphuric ether,	8 parts.

Of this tincture apply ten successive layers, upon the layers of euphorbium.

To insure the effect of these taffetas, moisten them with a small quantity of alcohol before application.

Lastly, Gentlemen, I would remind you that Messrs. Henry & Guibourt have published a formula, which consists in liquifying with double its weight of wax, the green oil that is obtained from cantharides by means of ether; the mixture is spread upon a sheet of waxed linen in the same manner as common adhesive plaster.

We can have no motive for giving the preference to either of the preceding formulas. We have sought to decide by experiments the relative value of these different vesicating taffetas.

M. Andral has been very willing to undertake these experiments.

We present the table resulting from the observations upon this subject gathered by M. Fournet, his resident assistant.

No. 1 is the taffetas according to M. Deschamps' formula; No. 2 is that of M. Thierry; the No. 3 according to formula of Henry & Guibourt.

Summary comparison between the three numbers.

Pain experienced.	Serosity at the raising of the blister.	Condition of blistered surface.	Time of drying.
No. 1.—Time of application, six hours. The pains felt were itching, prickings and heat. These effects were very prompt upon 5 patients, who could reply satisfactoriiy.	About 2 spoonsful of serous matter, limpid and of a citron yellow colour. Blister always well formed, except upon one patient, which broke during the night.	Simple redness of skin.	Desiccated almost always the sixth day.
No. 2.—Time six hours. The pains felt were prickings, smarting, and heat, which upon almost all the patients remained until the morning of the next day.	A spoonful and a half of serum. Blister well formed except upon one patient.	Skin slightly coloured red.	Desiccation obtained the sixth day.
No. 3.—Time four hours. Pains less sensible, and consist in prickings, itchings, and smarting.	Two spoonsful of serum and rupture of vesicle upon one patient.	Skin coloured rose red.	Desiccation obtained the fifth day.

Medical experience has given the advantage to No. 3; the blister is the quickest made, the pain less severe and of shorter duration, and the healing more prompt. These advantages are evidently owing to the absence of the euphorbium, whose persistant acridity is joined without any benefit to the more mild vesicating property of the cantharides. We are thus brought to give the preference to Henry & Guibourt's formula, although the product has not that appearance we are accustomed to find in the vesicating taffetas commonly employed.

This preparation presents a phenomenon somewhat remarkable; which is that the cantharadine often separates in crystals from the middle of the mass, which is likewise filled with a multitude of small white needles.

No doubt this preparation loses by contact with the air. It

ought to be kept in close vessels and only a small quantity separated at a time.

We ought in concluding to ask you to give thanks to Mr. Deschamps, whose production is that of a learned and judicious pharmaceutist.

(NOTE BY THE TRANSLATOR.)

The cantharadine plaster of HENRY & GUIBOURT alluded to in the above report, has been made repeatedly by Mr. DURAND for several years past. It was first made at the suggestion of a physician who desired to employ it in the vesication of an extremely delicate patient, and upon whom an ordinary blister would produce strangury; it fully answered his expectations. It is prepared by subjecting 1 lb. of powdered cantharides to several successive macerations in sulphuric ether, amounting in all to six pints. This upon evaporation yields about ten drachms of the green oil and extractive matter, which with ten drachms of white wax melted in it, furnishes a fine green plaster of good consistence for spreading and of pleasant odour. To preserve its activity, it requires to be confined in an air-tight recipient of small dimensions.

When you wish to use it, cut from adhesive plaster spread upon linen a piece the size of the intended blister, and spread over it with a spatula a very thin and regular layer of this plaster. Very little indeed is necessary. It adheres well and is very certain. It is optional whether a margin be left.

Its costliness will, however, prevent its being brought into general use.

Mr. CHARLES ELLIS, of this city, has introduced some of the blister cloth or taffetas of his own manufacture. Being recent it has not been as yet much used, but time will develope whatever merits it may possess.

It is not likely, however, that either of these will supersede the common blister plaster, which for cheapness and certainty, if carefully made from good flies, and well kept, will always command estimation.

ART. XXXIII.—DESCRIPTION OF THE WHITE SARSAPARILLA FROM TAMPICO, AND OF THE DIFFERENCES BETWEEN IT AND THE OTHER VARIETIES.—By J. J. Virey.

There has been presented to us by M. Gautheir, an apothecary of Paris, under the name of Tampico Sarsaparilla, a species or variety distinct in many respects from those met with in commerce, and which, nevertheless, is a true sarsaparilla. The means of distinguishing the best kinds, consist in being acquainted with all; hence the description of the present one appears to us of importance. Tampico is a port of the Gulf of Mexico, near to Vera Cruz, Honduras, and the other countries under the Tropic of Cancer, whence are derived the best kinds of sarsaparilla. These consist of long radicles attached to a head, and are folded upon themselves in bundles, in which manner they are exported; while the Brazilian sarsaparilla is without the head, and appears to be a distinct species in a botanical point of view—the stem being armed with thorns.

The article under consideration, presents the general structure of the true sarsaparilla, but it has not the brown or reddish colour belonging to the other kinds, its appearance is white, or of a less deep brown. The roots are striated, long, tenacious, and a little larger than the other varieties; they are destitute of the asperities or rigid hairiness of the sarsaparilla of Peru, and other countries. Besides, the sarsaparilla of Tampico, when chewed, is very mucilaginous; and has, independently of a slight degree of bitterness, a sweetish taste, which even appears a little sugary in some roots. Its ligneous medutillium is not large, and the cortical portion is doubtless very succulent in the fresh state, more so than in the others.

Generally the heads of this sarsaparilla are well developed, sometimes voluminous and suberose, as in China root, but of a pale colour; this lightness of tint pervades the plant and seems to indicate a large proportion of mucilaginous matter

in it. If this be of any utility in the properties of the medicine, the sarsaparilla of Tampico, under this point of view, will merit some preference; at the same time, however, the active part designated under the names of *smilacine* or *parigline* or *salseparine*, is not predominant.

This sarsaparilla presents all the characters assigned to the best species, with the exception of its lighter colour; there is reason to believe that it is a white variety of *smilax officinalis*, described by M. Kunth, in the *Nova genera et species Plantarum* of MM. Humboldt and Bonpland. We base this opinion, in the first place, upon the great resemblance, (colour excepted) between it and the true sarsaparilla derived from the same localities and found growing upon the borders of the Magdalena, in New Mexico, whence it is sent to Europe. Secondly, there are frequent examples of white varieties in many species of vegetables. These varieties depend upon colder or warmer localities, or degeneration by culture. What appears to give still more weight to this opinion, is the fact that the white varieties of vegetables are more abundantly supplied with mucilaginous elements, or possess active principles less elaborated. Now these characters will be recognised upon comparing the sarsaparilla of Tampico with the other kinds.

Circumstances may, nevertheless, present themselves, which will occasion a preference in favour of this sarsaparilla over others possessing more bitterness, and greater activity. The methods of treatment in which this kind of medicine is employed, should accord with the temperament, or intensity of the affection, for it is an error to suppose that recourse should be made to the most active principles.

Hence it is, that it will not be useless to try the comparative effects of many kinds of sarsaparilla, without confounding them indifferently, as has been done. This study can be effected in the hospitals, and may afford important therapeutic results with regard to the pharmaceutic preparations of this medicine now in use.

Journal de Pharmacie.

ART. XXXIV.—RESULTS OF EXPERIMENTS MADE UPON THE MILKY JUICE OF LETTUCE. (*Lactuca sativa*, *L.*, the variety termed Roman.) By M. * * *.

The juice which I examined was collected in the month of July, when the temperature was 24 to 25 R., from stalks of the lettuce about to flower. It was of great purity and possessed an oily consistence at the moment of exudation, it concreted rapidly, at the same time that it acquired a brownish tint. It exhibited an acid reaction.

Five decigrammes of this juice, dried by exposure to the atmosphere, furnished seventeen centigrammes of residuum, or 34 per cent. This product, which, as is known, is very analogous to what is called Lactucarium by the English, occurs under the form of irregular fragments, reddish brown externally, whitish internally, not perceptibly attracting humidity from the atmosphere, taste very bitter, smell virose.

The different experiments which I have made upon this juice have induced me to regard it as composed of:

1. A bitter principle, soluble in water and alcohol, insoluble in ether, not precipitated by the salts of lead.
2. Albumen.
3. Caoutchouc.
4. Wax.
5. An acid of which I have not been able to determine the nature, on account of the small quantity of juice which I had at my command.
6. Chloride of calcium.
7. Phosphate of lime.
8. Potassa.

It may also be possible, that gum and acetic acid exist in it. Gum has been stated to be present by Shrader, as well as a peculiar resin, of which I have not detected any traces; but I have found gum in the extract of lettuce obtained by expression, as also acetic acid and potassa.

As the plant with which we are now engaged, is only a variety of that which furnishes the extracts of lettuce employed in pharmacy, it must, I think, be admitted, that the lettuce juice obtained by me, has a great resemblance to, if not perfect identity with lactucarium. Now, from the characters which I have assigned to this product, it is plain that it differs essentially from the thridace, and that it has been erroneously confounded with it. In fact we know that the thridace powerfully attracts humidity from the atmosphere, which is attributable to the large proportion of deliquescent salts contained in it; that its taste is ordinarily saline and extractive, instead of being bitter, and that its smell is not virose. The necessity of establishing a distinction between these two medicines has already been pointed out by M. Chevallier, but it is really founded in facts, since Drs. Cox, Bidault de Villiers and Dumas, have made their experiments upon the lettuce juice (exudation) which they named lactucarium, and Dr. François has experimented with the extract obtained by expression, and to which he has given the name of thridace. It is surprising, that after such a distinction has been made, several formularies should state that the thridace is prepared with the juice of lettuce obtained by incision; this is an inaccuracy, which I have thought it necessary to point out, since it has the tendency to lead the physician into error, as to the chemical and therapeutic effects of this medicine, and it may lead him, in some cases, to suspect the honesty of the pharmaceutist.

Journal de Pharmacie.

ART. XXXV.—OF SASSARUBRIN, A RESIN EVOLVED BY SULPHURIC ACID FROM OIL OF SASSAFRAS, WHICH IS REMARKABLE FOR ITS EFFICACY IN REDDENING THAT ACID IN ITS CONCENTRATED STATE. By R. HARE, M.D., &c., &c., &c.

(From the American Philosophical Transactions.)

THE crimson colour produced by the admixture of oil of sassafras with sulphuric acid, is due to a peculiar resin, which I would call sassarubrin, being elaborated from the oil of sassafras, by its reaction with sulphuric acid, with phenomena which are striking, and, in some respects, singular. If a mixture be made of equal parts of the oil of sassafras, alcohol and sulphuric acid, on raising the temperature to a certain point, the whole mass rises up in a resinous foam, of a beautiful colour, between copper and purple, with a metallic brilliancy. In some instances, it has been partially forced out of the retort through the beak in a cylindrical mass, which acquired, on cooling, the consistency of pitch. This pitchy substance is a compound of the resin above alluded to and sulphuric acid, with which it forms a soluble substance, neutralizing its sourness to a certain extent. By steeping this subacid compound in ammonia, straining, washing the residue with water, and desiccation, a brittle tasteless resin remains which is quite insoluble in water, but very soluble in alcohol and hydric ether.

The addition of this sassarubrin to concentrated sulphuric acid, produces the crimson colour already mentioned as resulting from the presence in that liquid of a minute portion of oil of sassafras. I infer that the colour is due to the evolution of sassarubrin, which has a bassic affinity for the acid, to which it owes its birth. The ethereal and alcoholic solutions of sassarubrin are of the colour of a dingy white wine,

but acquire a deep crimson when mingled with concentrated sulphuric acid.

Sassarubrin may be produced by the union of the acid and oil, provided it be moderated by refrigeration or dilution with water.

Without some precaution, the heat produced is sufficient to char the resin more or less. The reddening influence of the oils of cinnamon and cloves is due to the generation of resins analogous to sassarubrin.

To those resins the names of cinnarubrin and clovorubrin may be severally assigned. Cinnarubrin may be evolved by adding oil of cinnamon to equal parts of sulphuric acid and water, previously mixed and refrigerated, the temperature being subsequently elevated till the mass rises up in a foam; when the whole should be poured into a solution of pearlash, from which the resin may be extricated by a strainer. It is analogous to sassarubrin, but it is less efficacious in colouring sulphuric acid, and does not, like the former, impart to the sides of the containing glass a rich red colour. Moreover, it appears to be partially insoluble in alcohol, and to retain sulphuric acid after being boiled with an alkaline solution.

I infer that a new series of resins may be evolved from the essential oils by their reaction with sulphuric acid; which, having a general analogy to each other, may still have discriminating characteristics, arising from the oils whence they may be derived.

ART. XXXVI.—UPON CHERRY LAUREL WATER.

By M. Faury.

In one of the articles in his thesis, M. Mialhe correctly observes that the distilled water of cherry laurel constitutes a medicine extremely variable in its composition, and consequently is a bad medicine. He attributes this variation of constitution to several causes; the first arises, says he, from the circumstance that all operators do not obtain the same quantity of water at one distillation; the second is attributed to the age and period of vegetation, and, doubtless, also to the temperature of the year; the third, and last, is, the greater or less age of the distilled water itself. In consequence of these judicious remarks, M. Mialhe, not being willing to deprive the Materia Medica of an efficient agent, proposes to substitute for the water of the cherry laurel, that of bitter almonds, as this can be procured at all times of the same strength. It appears to me that the causes which have induced M. Mialhe to reject the employment of cherry laurel water, are equally operative with respect to that from bitter almonds, and that this last is affected by others in addition; in fact, do not the pharmaciens, who think they should deviate from the proportions directed by the Codex in the preparation of cherry laurel water, pursue the same course as regards that of bitter almonds? Do not vegetation, temperature of the year, and, I will add, culture, manure, &c., modify the prussic flavour of bitter almonds? Let us join to these, the numerous varieties that these fruits present,—going on to infinity, so that it is the most difficult thing to meet with bitter almonds possessing equal bitterness, almost permitting us to suppose that each tree furnishes a variety, and we will possess reasons sufficient to reject the substitution proposed by M. Mialhe.

Now, since from what has been said, it is clear that the water of bitter almonds, on account of its variable strength, cannot supply the place of that from the cherry laurel in

medicinal practice; and as, on the other hand, we agree with M. Mialhe in condemning the latter, it remains for us to finish our undertaking and designate the substance that can be substituted for it advantageously. We propose, then, the active principle of this compound, that is the volatile oil of cherry laurel. This immediate product, always identical, is easily obtained and can be a long time preserved; it presents likewise the simple and easy means of obtaining a water of cherry laurel always uniform in composition, which can be renewed daily. The same proposition is applicable for the preparation of water of bitter almonds; it will obviate (if adopted) the equally numerous inconveniences, which this article presents in its composition.

To resume. I think with M. Mialhe, that the distilled water of cherry laurel is a medicine which ought, perhaps, to be rejected from the Materia Medica; but as it would be improper to deprive therapeutics of so powerful an agent, that it is necessary to replace it, not with the water of bitter almonds, but by the volatile oil of cherry laurel, in which resides its active principle. By an extension of the substitution and by analogy, I propose the same modification, as regards the employment of distilled water of bitter almonds.*

* We cannot approve either the substitution proposed by M. Mialhe, or that imagined by M. Faury, for the following reasons:—First, With regard to M. Mialhe; before substituting the water of bitter almonds for that of cherry laurel, it is necessary that there should be perfect identity of physiological action in both products, which, at the present day, has not been proved, or, as far as I know, even been tried. As to the reasons given by the same pharmaceutist, for rejecting the water of cherry laurel of the Materia Medica, we do not believe them to be well founded. If some manufacturers do not prepare this water in accordance with prescribed proportions, it is their fault and not that of the medicine, which should not be proscribed for a like cause. In the second place, the period when this preparation should be made is not arbitrary; it is that when the plant has attained its *summum* of growth, from the 15th of June to the 15th of August, and it even appears to us that the cherry laurel presents, in this respect, a much greater latitude than most plants of which divers pharmaceutical preparations are made but once annually. Finally, this distilled water is hardly more subject to alterations than others, when

I am of the opinion of M. Mialhe, relative to the preparation of volatile oils, and I even think that, in certain cases, by retarding the boiling point of the water, a result more advantageous is not obtained, but, moreover, a part of the product must be lost. This appears true, at least in the preparation of the volatile oil of cherry laurel. In effect, this essential oil, although much denser than water, comes over from the very first moment that ebullition takes place, and a much larger quantity is obtained by making good use of the heat.

Journal de Pharmacie.

ART. XXXVII.—RESEARCHES TO SERVE AS A HISTORY OF SAGO—AND AN EXAMINATION OF THE SUBSTANCE CALLED SAGO OF CAYENNE, OBTAINED FROM THE SAGO PLANT OF MADAGASCAR.* By M. PLANCHE. Read at the Royal Academy of Medicine. Extracted by M. FELIX BOUDET.

M. PLANCHE has had in view in this memoir, to clear up many points in the history of sago, upon which naturalists and chemists are still of opposite opinions; to deduce from the

proper precautions are taken to guard against them. We have preserved it in a good state, not only from one year to another, but even for two, three, or more years, in very small bottles, well stoppered and placed beyond the ordinary causes of alteration.

Secondly, Relative to the proposition of M. Faury, we do not think that it is possible to substitute for the water of cherry laurel, a solution of the volatile oil in distilled water. This will be reverting to the opinion of Fourcroy, who proposes to substitute in general for the aromatic distilled waters, aqueous solutions of the essential oils, an opinion to which therapeutics, a correct practice of pharmacy, and chemistry itself, have long since done justice.

P. A. C.

* Sagus Poitei.

comparative examination of the different species of sago, characters that can be of service in choosing them; and finally, to fix the attention of pharmacologists upon the substance deposited in the Museum of Natural History in Paris, by M. Poiteau, under the name of *Sago of Cayenne.* The first paragraph is devoted to very interesting details upon the period of the introduction of sago into France and of its consumption, from that time, until the present.

Although pharmacologists generally concede that its introduction dates from 1730, M. Planche regards it as certain, that it was several years before this period, that this feculent matter was known. He is supported in this statement by an autograph letter of the Marechal de Noailles, dated Philisbourg 1734,—in which mention is made of sago which was sent by the Marechal to a lady of Manchy, his relation, recommending it to her as a specific in diseases of the chest.

The first species of sago, or at least, that most anciently known with us, is the sago of the Maldives. It was first designated by the name of China sago; but was soon confounded with that of the Moluccas, and sold as such, when the Dutch, for a long time established at Amboyna, where they had exclusive possession of the commerce in this commodity, thought the moment favourable to put the sago of the Moluccas into circulation.

Still later, other species of sago have been brought from different countries of India and elsewhere, always under the name of Molucca sago, although they differ in many properties which will be indicated when each species comes before us.

The period when sago was most in vogue in France was from 1772 until 1784. From this until 1825 the estimation in which it was held diminished, but to date from 1825 to 1835 exclusively, it has successively increased; which is shown by the following table, the accuracy of which is vouched for by M. Planche.

In 1826 there were imported into France	6.583	kilogrammes.
1827	13.994	
1828	10.545	
1829	14.494	
1830	10.017	
1831	11.404	
Total,	67.039,	

Of which the mean is 11.173. Suddenly in 1832, the year of the cholera, from the influence of Hygienic instructions, which recommended the use of farinaceous articles, the amount increased to 28.588 kilogrammes; in 1833 it diminished to 12.545, to be increased during the following year to 18.725.

The remarkable augmentation just stated in the consumption of sago, from 1826 to 1834, appears to be owing to the introduction into commerce of two new species of sago—the white and the rose-coloured. At first a prejudice existed against the white sago, and upon the faith of the Dictionaire des Sciences Medicales, it was admitted that it had deteriorated; but soon, at the recommendation of M. Planche, the principal commercial houses trading in farinaceous substances, adopted the practice of washing it in cold water, and then drying it by a stove, and this very white sago, in the first instance the most inferior, became the most sought for, and possessed characters equal to that of the rose-coloured.

Description of the different varieties of Sago, of their Origin, of their External Characters, and of their Chemical Properties.

The researches of M. Planche relate to six species of sago, of which he has determined the nature with the most scrupulous exactness, by eliciting all the information attainable upon this subject.

The first comes from the Maldives.

The second from Sumatra.

The third from New Guinea. And

The three last from the Malaccas.

Sago of the Maldives.

This sago, which is still met with in some of the drug houses of Paris, is furnished by a palm of the Island of Malé, the largest and best cultivated of the Maldives. The specimen in the possession of M. Planche was sent to him by Mr. John Miller, a naturalist of Charlestown, who had dwelt many months upon the Malabar coast nearest to this isle. The sago of the Maldives comes to us under the form of rounded or ovoid grains, of considerable hardness, the diameter of which varies from one to five millimetres; some present a uniform colour of dried clay throughout their entire surface; others exhibit this colour on one side only, with a degree of the same tint on the opposite; others in smaller number are almost white. A vessel conveniently adapted to contain 1.000 parts in weight of pure water, when filled with this sago, contained 732 parts.

Placed in maceration during twenty-four hours with ten times as much cold distilled water, 500 grains (twenty-seven grammes) of this same sago absorbed 570 grains of it, and became doubled in volume. Exposure to dry air for some hours was sufficient to restore it to its original volume, hardness and colour; the liquid when filtered was colourless and insipid, without action on litmus, upon the tincture of iodine, upon that of galls, as also upon a solution of nitrate of silver.

The tribasic acetate of lead, produced slight disturbance in it, but the same phenomenon having been observed with distilled water, taken as a means of comparison, this result is entirely negative.*

* The tribasic acetate of lead, in the first instance indicated by Dr. Bostock as proper to detect the presence of amidon, is, according to M. Planche, less sensibly affected than iodine, and demands greater attention on the part of the experimenter. All the treatises upon chemistry assert, that it is not affected by distilled water, that the disturbance is produced only when the water contains carbonic acid or the sulphates. M. Planche has determined, nevertheless, that distilled water, which has no effect upon a solution of barytes or nitrate of silver, or that of bichloride of mercury, produces very perceptible milkiness upon the clearest solution of tribasic acetate of lead, when it is added in large proportion.

If evaporated by a salt water bath, an extract is obtained of a pale yellow colour, in weight equal to $\frac{1}{500}$ of the sago employed, of a slightly saltish taste, and from which alcohol separated a crystal of muriate of soda, but of so small a size, that it is not to be wondered at, that this salt was not detected in the first instance by the nitrate of silver.

Sago of Sumatra.

This sago was sent to M. Planche in 1827, by M. Bussail, surgeon of the navy, who procured it from the localities, upon his voyage round the world, under the orders of M. de Bourgainville. It comes from a palm which grows upon the east coast of Sumatra towards Malacca, where still live some Portuguese families who prepare it by a peculiar process.

The sago of Sumatra occurs in very round grains, from one to two millimetres in diameter, some of them entirely white, others of a dull yellowish white. It exhales a slight odour of musk, which it partly loses by washing in cold water; this odour, however, appears to be foreign to the sago itself, for it is sometimes observed in the rice of Carolina, which has been packed when still moist. Its weight, compared with that of water, was $\frac{684}{1000}$; the quantity of water absorbed by 500 grains was 670 grains, and its volume was more than doubled; the colour after desiccation was a little paler than in the natural state, in other respects it had recovered its properties.

The filtered *maceratum* was colourless, without decided taste, and underwent no modification from reagents, with the exception of the nitrate of silver which produced slight turbidness. The extract obtained weighed four grains, and contained an appreciable amount of muriate of soda. This sago is not found in commerce.

Sago of New Guinea.

M. Planche has received this sago from a relation of General Hogendorp, M. Burvil of Rotterdam, who brought it from New Guinea in 1807. Upon comparing it with that still to be obtained in some of the warehouses of Paris, under the

erroneous name of German sago,* he has satisfied himself that it is perfectly analogous to it; and, moreover, upon comparing its characters with those attributed by M. Lesson to a sago procured from a species of cycas of the Isle of Waigiou, situated to the North West of New Guinea, he thinks that it ought to retain this name. The grains of this sago have the form and volume of that from the Maldives,—but their predominant colour is brick red. Some grains are also to be noticed, which exhibit this colour, with a paler shade of it; others have a dull white tint. This sago is exceedingly difficult to reduce to powder; its weight, compared with that of water, was $\frac{728}{1000}$; 500 grains absorbed 604 of this fluid, and assumed double the volume. Desiccation by the atmosphere restored it to its primitive condition.

The *maceratum* was colourless, inodorous and insipid; it underwent no change from the addition of reagents. One grain and a half of an extract was obtained, which left upon the tongue an impression analogous to that of water distilled from Windsor beans, and contained traces of muriate of soda.

Sago of the Moluccas.

There exist in commerce three species of sago originally from the Moluccas, one called gray, to which druggists exclusively give the name of Molucca sago, while they designate the two other species by the names of rose-coloured and white sago of India.

Gray Sago.

This variety is in rounded grains, but less regular than in the preceding species, from one to three millimetres in diameter, of a pale fawn colour bordering upon gray; it appears to be the same as that which M. Lesson has seen prepared in

* Under the Empire, during the continental war, all the productions from the English and Dutch possessions in India, came to us by way of the Hanse towns, hence the name of German sago, for it is needless to state that sago is not cultivated in Germany.

the Isle of Bouron, one of the Moluccas, from the medulla of the *sagus Rumphii*. According to this naturalist, when the fresh separated fecula of the medulla is agitated with water, it is precipitated under the form of grains of a yellowish white colour. Its weight, compared with that of water by means of a standard vessel, was $\frac{672}{1000}$; 500 grains absorbed 544 of water, very nearly doubling the volume. By desiccation the primitive characters were regained, except the colour, which appeared lighter.

The *maceratum* was not altered by reagents, except the nitrate of silver, which formed a light precipitate with the chloride. The extract weighed three grains and a half; it was of a deep brown colour, slightly deliquescent, and contained more common salt than the others.

Rose-coloured Sago.

This variety is easily recognised by its uniform rosy gray tint, the minuteness of its grains, the largest of which are not more than a millimetre in diameter; it is, moreover, after the sago of New Guinea, the hardest yet examined. Its weight, compared with that of water, was $\frac{716}{1000}$; 500 grains absorbed 652 grains of water, its volume becoming doubled.

Reagents had no effect upon its *maceratum*, which by evaporation was reduced to an extract of a rose tint, taste stale, slightly saline, and in weight three grains. This sago, for several years has been much sought for by consumers, and it has a reputation which it shares with the white, the last that remains for us to study.

White Sago.

M. Planche thinks he can assert, upon the faith of M. Marchand, that this sago really comes from the Moluccas, and further, it appears to him very probable that it is nothing else than the Maputi sago, the whitest and most esteemed in Amboyna,—according to Rumphius and M. Lesson. Its weight, compared with that of water, was $\frac{776}{1000}$, and 500 grains absorbed 820 of this fluid, the volume becoming tripled. After

drying, it presented somewhat a translucent aspect; the *maceratum* had a stale sweetish taste, similar to a very thin solution of starch, without action upon litmus; it assumed a beautiful blue colour upon the addition of tincture of iodine, was rendered slightly turbid by the tincture of galls, and afforded, after some time, a white flocculose precipitate. The tribasic acetate of lead rendered the liquor opalescent, but no precipitate was formed. The extract obtained weighed twelve grains; it was of a dull reddish yellow colour, with the taste of baked starch, slightly saltish. Heated to redness in a platina crucible, it became swollen, giving out thick smoke with the odour of burnt bread, and the ash exhibited traces of muriate of soda, a salt which is found, as may be perceived, in all the varieties of sago.

Here M. Planche gives the reasons which induced him in the treatment of sago, to prefer cold water to hot, and the sago entire to its powder.

"At the period," says he, "when M. Raspail made his beautiful experiments upon the feculæ, three species of sago described in the memoir now published, were not to be found in commerce, viz:—the sago of Sumatra, the white, and the rose-coloured. Of the three other species, one alone was pretty abundant, and from the description given of it by the skilful observer mentioned, this must have been that from the Maldives:—

"M. Raspail experimented upon the sago whole, and employed cold water.

"M. Caventou in his analysis of sago, also employed cold water, but he acted upon this substance in powder. The first likening sago to the other feculæ, supposed the existence of a tegumentary substance insoluble in cold water, serving as an envelope to another contained soluble matter. The second assures us that sago is homogeneous in its composition, and that it is only a variety of starch soluble in cold, but more so in warm water. Evidently, if instead of experimenting as we have done, we had acted upon it in powder, the white

sago would have been confounded with the other species, as regards its chemical properties.

In order to examine sago well, says M. Raspail, it is necessary to allow it to remain in cold water during some hours. If portions of the superficies of the globules are then submitted to the microscope, we are convinced that all the grains of fecula have been broken, for the teguments, torn and gaping, are spread by myriads over the stage. Beneath this superficial layer, the grains, without having been broken, exhibit in their interior, and sometimes upon a point of their surface, a granular arrangement,—a corrugation to be detected upon all the feculæ that have been submitted for a moment to the action of heat, after having been simply moistened or kneeded. In the centre of the globules, on the contrary, there are perceived only whole grains not at all altered.

M. Planche has verified the correctness of the microscopic experiments of M. Raspail upon the sago of the Maldives, but he opposes the conclusions he has deduced from them by the following observations. These granules, which M. Raspail represents to us as torn and gaping, must necessarily yield to the water a quantity, more or less considerable, of the soluble matter they contain. Now M. Planche adverts to the fact that in his own essays, the five first varieties of sago, and especially that of the Maldives, did not yield to cold water the slightest trace of starch after twenty-four hours maceration. The same sago of the Maldives, allowed to remain in water during many months, has afforded a similar negative result, which proves, as he states, that the teguments of the fecula in the sago do not yield to the efforts of the water they enclose, and resist it so thoroughly, on the contrary, that if a grain of sago saturated with water, be divided with a scalpel, the amylaceous granules escape the action of the instrument, and can be agitated with cold water, without their losing the smallest quantity of amidine; whilst if the same humid sago be triturated for some time, the granules burst and yield their soluble parts to cold water, which then exhibits the characteristics of a solution of starch. Besides, the irregularity of

the forms observed by M. Raspail in the feculent grains of sago, is no matter of astonishment, since it is observed also in the fecula of the potato and others.

In another trial, by directing with caution the action of the pestle, M. Planche has been enabled to isolate completely and without rupture the amylaceous granules which constitute sago, which thus reduced mechanically to a state of simplicity assumes the general condition of the feculæ, that is to say, is, like them, insoluble in cold, and soluble in boiling water.

It now remains to inquire into the variable quantities of water absorbed by the first five varieties of sago, and of the increase in bulk which was the consequence. Upon investigating the cause of this anomaly, M. Planche has determined that it is owing to the unequal porosity of the grains of sago belonging to the same species. He made himself certain of this fact, by macerating the sago of the Maldives or that of New Guinea, the grains of which are naturally of various shades, during twenty-four hours in an aqueous solution of cochineal and alum. These grains were then washed with cold water and dried upon their surface with blotting paper. In this state it was easy to observe that the grains which were the palest before maceration, had assumed a bright red tint that did not penetrate deeply, while those most coloured had become of a reddish purple colour throughout. Finally, in those grains in which two shades of colour had appeared, the part where the deepest of these existed, evinced the greatest penetrability to the aqueous solution, for it yielded to the least pressure, while the other retained its consistence and elasticity.

The author has, also, occupied himself with the explanation of the colouring of sago; he thinks that the colour is peculiar to the fecula itself, and resides in its teguments. He has, in fact, observed, that by treating the sago of New Guinea with diluted sulphuric acid assisted by heat, its solution takes place with the assumption of a very slight reddish tint, and appears transparent to the naked eye, but if attentively examined with a glass, small coloured corpuscules are seen suspended in it,

which are transparent and very delicate, which in time are precipitated and are nothing more than the remains of the teguments.

After what has been said it is easy to explain why white sago gives up to cold water a small quantity of amidine; it is because its tegumentary envelope, probably less resisting, more extensible and more permeable than in the other species of sago, permits the cold water to penetrate to the amidine contained in its granules and to issue from them sparingly charged with this principle. Cannot this property, adds M. Planche, be turned to advantage in preparing, at desire, a drink slightly amylaceous from the white sago of the Moluccas, the residue of which already saturated with water, will serve for nourishment?

The memoir is concluded by some reflections upon factitious sago compared with exotic. The German is so friable that it breaks down between the fingers; that of Gentilly near Paris, has almost the hardness of genuine sago; but prepared as they are from the fecula of the potato, both retain a virose taste which betrays their origin, upon a delicate palate they bear the same relation to the rose-coloured and white sago, that the best wine of Suresne does to the wine of Volney.

At the end of the memoir, of which a detailed extract has been presented, M. Planche has appended a note upon the substance extracted by M. Poiteau from the sago plant of Madagascar, cultivated in Cayenne and designated by the name of sago by this naturalist. This substance prepared by M. Poiteau himself, is of a brown colour almost as deep as chocolate, and is composed of grains three or four times larger than a pin's head, irregular, some of them perfectly pure, others in some portions adhering to vegetable fibre. It is obtained by scraping and washing in water the inner white portion of the young plants, then pressing it through linen to separate the liquid from the matter in suspension and drying it in the sun.

M. Planche has examined this pretended sago; and upon a single inspection, it was easy for him to see that it had no analogy with the true sago. In fact, it exhibits a mixture of

ligneous fibres, white and broken, to which adhere small brown masses, that might be taken at first sight for the gum-resin opoponax. When examined with Raspail's microscope with a lens having a focus of four lines, small tubulous bodies are distinguishable, as also others which are alveolous, having in appearance some resemblance to the *sagotiferous medulla of the Cycas circinalis*, but more coloured, and in which the shining aspect of the fecula, so apparent in the latter, is not observed. Volume for volume, the substance obtained by M. Poiteau weighs one-half less than sago. When reduced to powder and treated successively, first by cold water, then by hot, it exhibits, in the first instance, no trace of starch with iodine, and in the second, the atoms are scarcely perceptible. The brown matter analogous to opoponax, when treated with boiling alcohol, yields to it only a small quantity of yellowish insipid substance as soluble in water as in alcohol. When thrown upon coals, it soon inflames and burns of itself slowly, and leaves a small quantity of slightly alkaline ash. Finally, it is affected by several chemical reagents in the same manner as ligneous fibre.

From this examination it follows, that the substance extracted by M. Poiteau from the sago plant of Madagascar, is not true sago.

Journal de Pharmacie.

ART. XXXVIII.—NOTE UPON COFFEE.—By MM. ROBIQUET & BOUTRON. Read at the sitting of the Societe de Pharmacie, February 1, 1837.

THERE are few organic productions of any importance upon which chemists have not more or less industriously laboured, in the hope of discovering some of those immediate principles to which their most prominent properties are attributable; thus coffee, so generally in use on account of the peculiar and marked influence it possesses over the animal economy, has been, at divers times, the subject of reiterated experiments, but up to the present moment no striking result has been elicited by these efforts, and we have yet to learn if its remarkable action depends upon a peculiar principle, or the whole of its components. It was with the hope of filling up this void, that for the second time we undertook the analysis, determined not to abandon it until our efforts were crowned with some success, but we have calculated upon perseverance beyond our strength; and, at last, we have abandoned the effort which presents nothing satisfactory. At the same time, we have determined to publish our results, imperfect as they are, in order to assist those more skilful and determined than ourselves who may make new attempts, that the same path may not always be trodden, and to lead them, if possible, into a more favourable direction.

Knowing from all that had been written, and from what we had done ourselves, that coffee contained a fatty substance, we were desirous of commencing by extracting it, that greater distinctness might be attained in the subsequent products; and to accomplish it, we had recourse to ether, which removed from the entire grain only a species of very consistent brown wax. If, after treating it at first in this way, the green coffee is pulverized and placed anew in the same menstruum, the tinctures acquire a citrine colour; and leave, upon evaparation, a considerable quantity of a fixed oil of a clear

yellow colour, possessing the taste and smell of green coffee. This oil readily combines with caustic alkalies, and forms a hard soap, becoming coloured reddish brown, in consequence of the reaction of the alkali upon a colouring principle contained in the oil, which becomes developed only by time. The proportion of this oil does not exceed two ounces to the pound; and it is evident, from what has been stated, that it exists in the very interior of the grain, while the exterior surface is simply invested with a layer of vegetable wax. It should be remarked that the ethereal tinctures, last obtained, abstracted with the oil a white substance, which concreted upon evaporation—and which could be separated from the oil by the filter while warm. What remained upon the filter being compressed between bibulous paper and then dissolved in boiling water and refiltered, a fibrous crystallization due to the caffein was obtained by refrigeration.

The filter retained a whitish granular substance, which resisted the action of boiling water; and which, nevertheless, placed upon a plate of platina and heated, was liquified and gave out the smell of fish oil. It also sometimes happened, that we saw in the product of the evaporation of these last ethereal tinctures, a small number of yellow shining minute crystals which emitted, when burned upon a piece of platina, the marked odour of sulphurous acid, and exhibited a blue flame. Coffee, then, contains a small quantity of sulphur.

Desirous of ascertaining whether the odour and taste of green coffee, which the fixed oil manifests, do not depend upon an essential oil that it contains, we boiled a small quantity of it in a distilling apparatus ; and we obtained as the product a slightly lactescent water, having a feeble smell of horse-radish.

After having exhausted the coffee with ether, we employed alcohol at different degrees, 40°, 36°, 22°. Each of these vehicles was employed both hot and cold, but not having obtained any result worthy of being cited, we took another quantity of coffee equally exhausted by ether, and we submitted it to three successive decoctions in distilled water. All

the liquids were united and the neutral acetate of lead added in slight excess, and a magma obtained of a beautiful citrine yellow colour, which, when properly washed and suspended in a certain quantity of water, was submitted to a current of sulphuretted hydrogen. When the reaction had been sufficiently prolonged, it was heated to boiling, in order to drive off the excess of gas and then thrown upon a filter. The liquid product was evaporated by means of a salt water bath, to a consistence almost syrupy, then allowed to remain a very long time, and yet no crystallization took place. It is very probable that this product was not pure, for the coffee evidently contained colouring matter, which alkalies rendered more apparent by deepening the shade and causing it to pass often from yellow to green, properties which are found in a marked degree in the product of the precipitate of lead, treated by sulphuretted hydrogen; but this product also contains an acid of some energy, judging by the taste which is very decided. These two principles, viz.: the colouring matter and the acid, are present in the greater number of combinations, so that it is difficult to establish with clearness the distinctive characters of each of them; and doubtless, from this cause, all the chemists who have investigated them up to the present time, have disagreed as to the nature of the acid;—thus, while Cadet regards it as the gallic, Grindel confounds it with the kinic, Payssé makes it a peculiar acid, and Pfaff considers it as the cause of the aromatic odour of burnt coffee, which we may remark, *en passant*, appears to us to be very far from the truth, for we have observed nothing that can support this opinion. We would be more disposed to look upon it as the gallic acid, with Cadet, on account of its action upon the persalts of iron, for which it is really a very sensible reagent. We conceive that in order to give a positive opinion with regard to it, it is necessary to separate it from the colouring matter; but this product does not possess sufficient interest to induce us to seek the means of overcoming this difficulty.

To give connexion to our experiments, we took the decoction from which the acid and colouring matter had been

separated by the acetate of lead, and caused to pass through it a current of hydro-sulphuric acid to decompose the excess of acetate. This liquid being heated and filtered, was finally evaporated to the consistence of an extract. This extract re-dissolved in alcohol, furnished two different products, one soluble in this vehicle and which yielded, upon evaporation, an abundant crystallization of caffein; the other soluble in water, left only extractive matter, tumefying by heat and giving off, when torrefied, an odour more analogous to that of burnt coffee, than any other product having the same origin—but yet far from identical with it.

We pass rapidly over these facts, because none of them being capable cf facilitating the solution of the problem sought for, it would be useless to insist upon them further.

We have tried other measures in addition, but without greater success; these we shall mention for the benefit of our successors. It has been supposed that torrefaction developes new principles, and it has often been asserted that an essential oil is driven over by heat, the true source of the odour of coffee. To be assured of this, we constructed a small condensing apparatus, composed of two matrasses fitted to each other, one the roaster, the other the receiver and condenser. It was believed, from the arrangement we had made, that no product of torrefaction could escape, and yet only a small quantity of pure water, in the first instance, came over, then acetic acid coloured with a litle oil having an agreeable taste, but very sensibly empyreumatic, although the coffee had not attained the requisite degree of charring. Such were the only volatile products we obtained, water, acetic acid, and empyreumatic oil. In fact, this oil, when in very small amount, has an agreeable odour, and the acetic acid accompanying it, contributes not a little to bestow greater diffusibility upon it. It may, perhaps, be recollected that one of us has proved that acetic acid serves as an odoriferous vehicle to many perfumes.

To return to our operation, we ought to add that the longer this torrefaction is prolonged, the more the acetic acid becomes

concentrated and the more the empyreumatic oil becomes acrid and disagreeable, and that at last a fourth product is added to the preceding; this consists of long filiments which attach themselves to the sides less heated; a little warm water easily removes them, and the filtered solution, upon evaporation, yields crystals of caffein. It is, probably, on this account that some have thought that benzoic acid was disengaged during torrefaction. M. Labillardiere, an old member of the Academy, has informed one of us that he has collected these crystals by means of a cone of paper placed over burning coffee. We have repeated this experiment by substituting a glass vessel for the paper cone, and we have noticed it covered with long delicate arborizations presenting the characters of caffein.

Not having gained any thing by this procedure, we directed our researches to roasted coffee, for here at least, thought we, it is very certain that the active principle must be found developed,—since it is prepared thus that it produces so great an effect upon the animal economy. But all our efforts were useless; the burnt coffee preserved its secret as completely as the green. It is true, however, that ether separated from it an abundant brown fixed oil highly charged with its aromatic principle, but nothing could isolate the latter; thus it was boiled in vain with water in a distilling apparatus; no product could be obtained representative of the taste or smell, and still less of the properties of coffee. It would appear then, that this principle is fixed, or at least, that it remains adherent to the oil; which, moreover, undergoes but little alteration by this slight torrefaction.

It remains for us to state, in order to complete the table of failures, that the presumed presence of gallic acid has induced us to try the method by fermentation upon green coffee, and we have thus been enabled to determine a species of putrefaction in this grain. Coffee becomes very white after being macerated some days, the water acquires a high degree of colour and a viscid consistence, and, if submitted to evaporation, an extract is made, which re-dissolved by alcohol, affords

a notable quantity of caffein. During the first days of maceration, the odour of horse-radish is perceptible, but little by little this odour becomes more disagreeable and finally stercoraceously fetid.

The only striking facts resulting from this resumption are, that fine green Martinique coffee, the only kind upon which we experimented, contains about one-eighth of its weight of fixed oil, and that after torrefaction this oil is charged with an aromatic principle, and even with the taste of burnt coffee; that, moreover, caffein is found in all the products of coffee, whatever mode of treatment it is made to undergo. This, then, is a principle that must be regarded as little alterable,—since it resists the destructive action of fermentation and the elevated temperature of torrefaction. We have suspended it in water, and it has thus remained for many months exposed to the atmosphere, without appearing to have undergone the least alteration.

We would be induced, in the meantime, to attribute to this product the essential properties of coffee, for it alone, of all, presents some characters a little striking; and the circumstance is remarkable, that it not only contains azote like the greater number of active vegetable principles, but like them, it forms an insoluble compound with tannin. We have even taken advantage of this property to extract caffein, as has been done by M. Henry Jr., with respect to some alkaloids. Thus we took 500 grammes of coffee slightly torrefied, only sufficiently so to render it readily powdered. We next boiled this powder twice in two litres of water at a time, and during twenty minutes. These decoctions, after being strained, reddened litmus; they were saturated by some drops of the solution of caustic soda, and a strong decoction of galls was poured into them. An abundant precipitate resulted, which sometimes was curdled and easily subsided to the bottom of the vessel, and sometimes remained suspended in the liquid. In this last case, it is necessary to take care to consult the state of saturation of the liquid; and to add, as required, either a little caustic soda, or diluted sulphuric acid, so as to produce

coagulation of the precipitate. When this had been obtained, the whole was cast upon a thick cloth. When the precipitate was well drained, it was triturated in a marble mortar with fifty grammes of lime, the air being excluded, and it was then boiled twice over in six decilitres of alcohol at 33°. The alcohol, filtered while boiling, was submitted to distillation so as to drive off $\frac{5}{6}$ of its volume, and the remainder poured into a capsule and evaporated by a slow heat. Upon cooling, palmate crystals were obtained of a greenish colour, more or less deep, but which entirely disappeared upon solution and crystallization anew.

The principal varieties of coffee submitted to this treatment furnished us the following results for 500 grammes of each:—

			Grammes.	Grains.
Martinique	coffee,	caffein,	1.79	32
Alexandria	"	"	1.26	22
Java	"	"	1.26	22
Moka	"	"	1.06	20
Cayenne	"	"	1.00	19
St. Domingo	"	"	85	16.

We ought to remark, in conclusion, that we have not been enabled to extract from coffee the concrete volatile oil, which is supposed to exist in it, and we will add, relatively to the solid fixed oil having the smell of cocoa, spoken of as one of its products,—that it must exist in very small proportion, but that the principal oil met with is the fluid fixed oil, a little coloured in the first instance, but becoming brown from age. We may state, finally, that the major part of the acid which is isolated by the acetate of lead, is combined in the coffee with lime, and very probably it is not the same as the free acid which we believe to be the gallic. It is very certain that when the decoction of coffee is treated by acetate of lead, in order to separate the acid and the colouring matter, if the excess of lead be precipitated by sulphuric acid, and then evaporated, a considerable quantity of sulphate of lime is obtained, which is sometimes taken for crystals of caffein.

Journal de Pharmacie.

ART. XXXIX.—NOTE UPON THE PREPARATION OF IODINE AND BROMINE. By M. Bussy.

The method of obtaining iodine generally followed, which consists in decomposing the mother waters of barilla by means of concentrated sulphuric acid, as has been a long time known, is liable to give very variable results, in consequence of a portion of iodine often passing off by volatilization, either in the state of hydriodic acid, or in that of chloride of iodine; and in either case there always results a notable loss in the quantity of the product.

To remedy this inconvenience, M. Soubeiran had proposed to precipitate the iodine of the mother waters by means of sulphate of copper, and afterwards to decompose the iodide of copper by peroxide of manganese at an elevated temperature.* But this process demands minute attention and many precautions when it is attempted to obtain the whole of the iodine that exist in the mother waters, and we do not believe that it has ever been followed in any manufactory. These reasons have induced us to make known a mode of proceeding much more simple, which has been employed lately by the manufacturers of iodine. It was discovered (if we are correctly informed) by M. Barruel, superintendent of the chemical works of the faculty of medicine; it consists in precipitating the iodine of the mother waters of barilla by means of a stream of chlorine. In order to do this, the mother waters are evaporated to dryness, to the residue of the evaporation a tenth of its weight of peroxide of manganese in powder is added, the two are intimately mixed and the combination heated to a commencing red heat in an iron boiler, agitating it frequently. This calcination has for its object the conversion of the sulphurets, and hyposulphites which are in great abundance in

* Journal de Pharmacie, t. xiii., p. 427.

the mother waters, to the state of sulphates. It is very easy to understand that these compounds are transformed into sulphates by taking a small quantity of the calcined matter, and pouring upon it sulphuric acid in excess. It ought not to give rise either to disengagement of sulphuretted hydrogen or a deposition of sulphur when the transformation is complete.

If, during calcination, violet fumes are disengaged, it is necessary to moderate the action of the heat in order to avoid the loss of the iodine.

When the sulphurets are entirely decomposed, the residue is dissolved in a sufficient quantity of water to obtain a solution at 36° of the areometer.

Into this solution a current of chlorine gas is made to pass, taking care to agitate it continually with a glass rod; the liquid becomes deeply coloured, then turbid, and allows the iodine to deposit under the form of a black powder; it is collected and distilled in a glass retort, in order to obtain it in the crystallized state, as it is found in commerce. The only difficulty which this preparation presents, is that of properly seizing the point when the action of the chlorine should be arrested, so as not to make it pass in excess and re-act upon the precipitated iodine. This excess of chlorine is to be especially guarded against, when it is desirable to extract from the same mother waters the bromine they contain. It is requisite in order to avoid adding an excess of chlorine, to allow the liquid to settle when it is supposed to have reached the point of saturation, to withdraw the current of chlorine, and direct the gas upon the surface of the liquid; for as long as the iodide is held in solution, a pellicle of iodine will be seen to form upon it, which effect no longer takes place when all the iodine is precipitated; in this last case the liquid becomes clear rapidly, and only retains a slight reddish tint.

The extraction of bromine, which is ordinarily practised, also presents great difficulties which can be avoided by the following method:

This method is very analogous to the preceding. It is, like it, based upon the elective affinity of chlorine, and upon the

property which this possesses of displacing bromine from its combinations. It, moreover, permits a useful application of the mother waters of iodine, which hitherto were valueless. The mother waters of barilla, after the iodine has been precipitated by chlorine as has been described, contain bromine in the state of a metallic bromide, when care is taken not to add more chlorine than is rigorously required to precipitate all the iodine. There are added, to one thousand two hundred and fifty parts of these mother waters, thirty-two parts of peroxide of manganese in powder, and twenty-four of sulphuric acid at 66°. The whole is poured into a tubulated glass retort to which is adapted a tubulated globe receiver, and to this last a tube which communicates with a proof glass. The retort and globe, as also the globe and the tube, should be so exactly fitted to each other as to admit of its adaption without lute or stuffing, which would inevitably be destroyed by the action of the chlorine. All being thus arranged, the retort is heated, so as to cause the liquid to boil; the bromine condenses in the globe under the form of red oily striæ with a small quantity of water; the operation is interrupted when red vapour ceases to come over.

By gently heating the globe without displacing the apparatus, the bromine is driven over into the proof glass, where upon cooling it will be condensed.

The mother waters which have been employed in this preparation, are to be rejected, when it is ascertained that they contain no more bromine by the addition of a new quantity of sulphuric acid and oxide of manganese.

Journal de Pharmacie.

ART. XL.—CHEMICO-LEGAL RESEARCHES, TO DETERMINE THE PRESENCE OF VERY SMALL QUANTITIES OF HYDROCYANIC ACID—EITHER FREE OR COMBINED. By M. OSSIAN HENRY.

WHEN researches are instituted having *legal chemistry* as their object, the slightest modifications ought to be published which can render processes in use more precise and certain in their execution; with this motive I have determined to present those which I have made, in order to appreciate with exactness the *very minute quantities of hydrocyanic acid, free or combined,* contained in different products. Having had occasion to inquire into the existence of *hydrocyanic acid,* I have been induced to believe that of all the methods published, either recently or long since, that most advantageous beyond doubt, for the purpose of fixing and seizing this principle, consists either in precipitating it directly by the nitrate of silver, or in volatilizing it by distillation; or after having eliminated it from its compounds, receiving the volatile product in a weak solution of this salt very pure. The hydrocyanic decomposes this last and gives origin to a white curdled deposit of considerable amount insoluble in water, and in weak nitric acid, and which consists of *cyanuret of silver.**

* A liquid containing hydrocyanic acid (prepared recently by the method of *Gea Pessina*) was separated into two equal parts A. and B. The first, A., furnished by distillation *dry cyanuret of silver* 3.10. The second B., by direct precipitation *dry cyanuret of silver* 3.00 in weight, almost the same.

This experiment is at variance with that obtained under circumstances almost similar, where the quantity obtained by distillation was found in the least proportion, probably on account of the transformation of the prussic acid into formic. I think that the proportion of water to the prussic acid was, in this case, so small, that the latter was enabled to disengage itself promptly without undergoing any action on the part of

This cyanuret is not easily affected by light, for I have left it in the experiment glass and under water exposed during three months to ordinary light, and although it had assumed a grayish violet tint, it retained all its properties.

The hydrocyanic acid being once fixed in this way by an insoluble combination, the volume of which permits the detection of the smallest quantities; there are, then, many methods of proving really the presence of this acid, either by treating it with muriatic acid, which disengages the *odour of bitter almonds*, or by transforming it by means of corrosive sublimate into a cyanuret of mercury, crystallizing in beautiful prisms and soluble in water, &c. These proofs are unquestionably easy to obtain when sufficiently notable proportions are procured, but the same is not the case when these proportions are very minute. I believe that under such circumstances the prussic smell is too feeble, and of too short duration, to be perceived certainly by our senses; besides, the formation of the cyanuret of mercury presents other difficulties. To obviate this inconvenience, I have thought that reactions capable of producing *prussian blue* or *red ferrocyanate of copper*, offered a great advantage. M. Lassaigne had already presented a method which detected traces of hydrocyanic acid in a liquid, but as this method did not always furnish decided reactions, I have endeavoured to substitute for it another process,—which appears to me to conduct to a result more determined. It consists in transforming in a few moments, and without difficulty, the cyanuret of silver into a soluble ferrocyanate, which can give *blue or reddish brown* precipitates with the salts of iron at a *maximum*, and with those of copper.

It was necessary, before putting this method or modification into operation, to be certain of the sensibility of the reagent employed, and I have done this in the following manner:—

0 gr. 1 decigramme of ferrocyanate of potassa was dissolved

the other liquid. But when the quantity of water is considerable, the degree of volatility of the organic compound is so diminished as to be easily modified by the water and heat.

in twenty grammes of pure water. I then took two grammes of this solution and added them to 198 grammes of pure water. The whole liquid then represented $\frac{1}{20,000}$ of ferrocyanate of potassa. This liquid, treated by the muriate of the peroxide of iron, afforded a very deep blue colour, and a little after, a deposit of prussian blue which settled to the bottom of the vessel. This blue colouring was even very perceptible when the liquid contained only the $\frac{1}{40,000}$ of the same salt of potassa.

With the sulphate of copper the reddish brown tint appeared in a very distinct manner, in the first solution of $\frac{1}{20.000}$.* I still was desirous of being convinced of the possibility of isolating, by the salt of silver, extremely minute proportions of *hydrocyanic or prussic acid.* For this purpose I made the following solutions:—0 gr., 1 decigramme of cyanuret of potassium was thrown into twenty grammes of distilled water, this solution formed an abundant reddish brown precipitate with the permuriate of iron. Two grammes of this liquid were then added to 198 of water. There resulted a product of $\frac{1}{20.000}$, in which the weakest solution of nitrate of silver formed a light flocculent deposit, capable of being collected after it had settled in a narrow vessel. I obtained in the same manner, a similar deposit with a liquid of $\frac{1}{40,000}$; and both the deposits, placed upon test glasses and treated in the way which will be mentioned directly, afforded a very appreciable amount of prussian blue, the presence of which could not be questioned.

Upon the strength of these experiments, since they had been made upon the smallest scale, I endeavoured to detect hydrocyanic acid in complex liquids, as wine, broth, fermented products, urine, and fluids obtained from the intestines and

* I wished to prove at the same time the sensibility of sulphocyanuret of potassium by salts of the peroxide of iron. A liquid containing $\frac{1}{20,000}$ of this salt, gave me, with the muriate at a *maximum*, a pretty intense red tint and with the $\frac{1}{30,000}$, but with the $\frac{1}{40,000}$ scarcely the tint of onion peel. With the sulphate of copper and a deoxygenizing body with the $\frac{1}{20,000}$ there appeared a whitish cloudiness.

stomach of dead bodies, to which I purposely added small quantities; I even allowed these mixtures to remain several months, (the vessels in which they were contained being well stopped,) and by my method sought for the presence of the poisonous acid I had added. In every case I was so fortunate as to find it in appreciable quantities, even after four and five months. I had, in truth, made use, in these experiments, of the prussic acid prepared according to the plan of *Gea Pessina*, (see *Journal de Pharmacie* t. xvii., p. 315, and *Traité de Pharmacie* by M. Soubeiran,) which is now known to be capable of preservation during a long time without undergoing alteration,* which is not the case generally with the same acid obtained by other processes, for its existence is but ephemeral.†

I also took animal matter from bodies which had been allowed to remain a long time in a state of putrefaction and endeavoured to determine if *hydrocyanate of ammonia, or of any other alkali* had been formed, but without success. I do not wish to infer, however, that this salt cannot be formed in decompositions of this kind; I pretend solely to demonstrate that that which I detected in the preceding mixtures was the acid purposely added by myself some time before.

Finally. I gave to three frogs of large size, several drops of hydrocyanic acid a little diluted; when these animals were dead (which occurred in about a quarter of an hour) I allowed them to remain untouched for two, four, and eight days, when I divided them into pieces and distilled them with pure water; the volatile product, when received by a very weak

* I now possess a bottle half filled, which has been prepared for five months; it is as colourless as upon the first day, and has the same strength, odour, &c.

† The method of *Gea Pessina*, an apothecary of Milan, is the following:—Take of the ferrocyanate of potassa, 180 grammes; sulphuric acid, at 66°, ninety grammes; water 120 grammes; add the water to the sulphuric acid, and the mixture thus formed to the ferrocyanate of potassa in a tubulated retort, to which a globular receiver is adapted, the latter is to be surrounded with ice and in it the acid is condensed with an excess of water.

solution of nitrate of silver, afforded in all three instances a light gray powder, in which the existence of hydrocyanic acid was more decidedly proved by the method I shall now indicate.

Process for appreciating very minute quantities of hydrocyanic acid, free or combined.

When a liquid, or any product whatever, is supposed to contain hydrocyanic acid, either in a free state, or in combination with a base, it is necessary either to precipitate it at once by a weak solution of nitrate of silver, or if the liquid is coloured and mixed with foreign salts, to distil it in a glass vessel well adapted for the purpose, adding water only in the first instance, or acidulated with muriatic in the second, the compound being a little concentrated before hand; the volatile product is received into a solution of nitrate of silver very much diluted, and soon forms a turbid white precipitate which subsides to the bottom of the vessel; when the disengagement no longer produces any cloudiness in the solution, the operation is to be arrested and the precipitate separated. This is washed in distilled water, when it is collected carefully in order to be moderately heated with one-half its weight of common salt ;* it is then allowed to cool and filtered; sometimes the liquid is a little cloudy from the presence of a small quantity of alkaline cyanuret, which dissolves the chloride of silver. To the filtered product is added a small quantity of *hydrated oxide of iron*, (made by precipitating the protosulphate of iron in solution by potassa,) which is greenish, being a mixture of protoxide and peroxide; it is filtered again after being moderately heated, and the least traces of *ferrocyanate of soda* being present (a salt which is produced in the preceding reactions) arising from the original prussic acid; a blue colour is obtained by the addition of a few drops of a solution of the muriate or sulphate of the peroxide of iron. After a few hours this colouring disappears and gives place to

* For this salt may be substituted, either muriate of potassa, or muriate of lime, or magnesia.

a light deposit of prussian blue (when the product is rich in ferrocyanate, the blue deposit is very abundant.)

The deutosulphate of copper also added to a part of the above liquid, forms a chesnut brown precipitate, or only produces a reddish tint which gradually gives place to a light precipitate.

ADDITION.

I have also succeeded in transforming cyanuret of silver into sulphocyanuret, which furnishes an accessory proof. The following process has been followed: the cyanuret was mixed with one-half its weight of washed sulphur, then heated in a small tube of glass, until fusion took place, (which was pretty rapid). The residue, when triturated, was treated with a solution of common salt, and then filtered; it gave

1. A more or less decided *crimson red colour* with the *muriate of the peroxide of iron.*

2. A whitish deposit, with the deutosulphate of copper when a little protosulphate of iron was added.

Journal de Pharmacie.

ART. XLI.—PREPARATION OF CARBURET OF SULPHUR.

By G. F. Muller, Lecturer in the School of Medicine at Rotterdam.

By the side of the orifice cut in an iron bottle make another similar opening. Into the first fit a copper tube having a diameter of 0m. 01., curved twice at a right angle ; into the second is introduced a straight tube, having the same diameter. The bottle is filled with pieces of charcoal recently reddened and of suitable size, so as to pass through the tube. After the tubes are adapted, the bottle is placed in a furnace and heated, after having surrounded it by a stone cut in two, so as not to be too much inconvenienced by the ascending heat. To the curved copper tube is attached a Woulf's apparatus half filled with water and surrounded with a frigorific mixture, and when the bottle is properly heated, fragments of sulphur are introduced through the straight tube, into which a stopper is immediately placed. The sulphur melts, descends, penetrates the fragments of charcoal, and when the sulphur is added a little at a time, a small amount of gas is obtained and much carburet of sulphur. In this way I have obtained repeatedly, a considerable quantity of carburet of sulphur.

Journal de Pharmacie.

ART. XLII.—UPON THE RED AND WHITE OXIDE OF PHOSPHORUS.—By G. F. MULLER, Lecturer in the School of Medicine of Rotterdam.

PELOUZE takes the white crusting upon old sticks of phosphorus for a hydrate, and H. Rose does not consider it different from ordinary phosphorus, but in consequence of its state of aggregation. The red powder which sometimes invests phosphorus is prepared by exposing this substance in warm water to a current of oxygen gas, in which operation the phosphorus unites with this gas, emitting light and developing heat. It is hence stated that the red powder is an oxide.

Some years since I received several cylinders of phosphorus which had been kept thirty years in an open bottle exposed to the light. Their surface was entirely white and covered with a layer of white substance about a millimetre in thickness. I placed these cylinders in another bottle filled with pure distilled water, and it was not without surprise that, upon the following day I beheld them changed entirely to a red; and although it is now four years since they have been in contact with the light, they still retain the same beautiful red colour.

This observation is opposed to the opinion of Pelouze and that of Rose. The only idea I can form of this sudden change of the white crust of phosphorus into red oxide by distilled water, is that the small quantity of oxygen in the distilled water must have changed the white coating into an oxide, and since this quantity of oxygen is very small, the white substance cannot be an oxide. I presume that the phosphuretted hydrogen always formed by phosphorus in water may be the cause of it. In order to determine this, I passed a current of phosphuretted hydrogen gas through water containing red oxide of phosphorus in a state of extreme division. By this operation the red oxide was by little and little reduced to the white substance, which, in its turn, was changed after some days to

the red oxide, by shaking it without the contact of light, with fresh water in which was contained oxygen.

From this it is evident that the white incrustation of phosphorus is a combination of *phosphuretted hydrogen* and of red oxide of phosphorus, and that there is but one oxide of phosphorus, which is red.

In keeping phosphorus under water, it becomes decomposed, forms oxide of phosphorus and phosphuretted hydrogen, part of which combines with the oxide of phosphorus, and gives rise to the white substance mentioned.

Journal de Pharmacie.

ART. XLIII.—UPON THE ANIMAL OIL OF DIPPEL.—By M. Klauer, pharmacien at Mulhausen. Extracted by M. Vogel.

There are a great number of pharmaceutic preparations formerly much employed, which have at the present time fallen into complete discredit, or at least, are less in use. Should we not, for some of them at least, attribute the cause of this to the pretended rational modifications which the preparation of them indicated by their authors has undergone, and which has changed them in nature and medical properties. This observation alreadily verified as regards the spirit of mindererus, is especially applicable to the animal oil of Dippel, upon the composition of which modern chemistry has thrown so much new and unexpected light. The older authors say that this oil has a sweet smell, and an agreeable taste; the same certainly cannot be said of our volatile animal oil, which has an extremely disagreeable taste and smell. What can be the cause of this difference? The first idea which naturally presented itself to M. Klauer, was to search for the method of

preparation employed by M. Dippel and the older physicians. He has found that Dippel obtained this oil by distilling animal oil without addition, until a black residuum no longer remained, so that he submitted it to five distillations at least. This process was successively modified in some points by Frederic Hoffman and George Model. Still later, it has been directed to agitate the black oil of hartshorn with warm water to separate the supernatant oil from the aqueous solution which contains the major part of the ammoniacal salts contained in the oil, and to distil this until it commences to pass over of a yellow colour; and finally to distil it alone until it leaves no more residue. The author repeated the process of Dippel upon a volatile animal oil which had already a clear yellow colour. Successive distillations were practised in a retort, by means of a salt water bath; the black residue diminished gradually, and it was only after being repeated four times that it disappeared entirely. The product of the fourth rectification was then as clear as water, its refrigerant power was considerable, it had the agreeable smell of cinnamon, and a burning taste—afterwards sweet, which recalled that of good cinnamon and pepper; yet if preserved any length of time, even in a dark place, it recommenced to become yellow. The specific gravity of this oil was = 0.865. Rubbed with caustic potassa, it gave rise to the disengagement of ammonia when aided by heat.

The result of this experiment accords with the last researches of M. Reichenbach, upon the products of dry distillation of organic bodies. This skilful chemist has demonstrated, in fact, that all sorts of pitch, and consequently the oil of hartshorn also, afford eupione, creosote, capnomore, picamare, ammonia, acetic acid, &c. But by the successive rectifications of animal oil, the greater part of the substances little volatile, such as creosote, picamare, capnomore, as well as the peculiar principle easily oxydized, remain by little and little in the retort, whilst in the product of the distillation, eupione ought to be found in combination with a certain quantity of picamare and of capnomore, of which it is difficult

to free it. From the properties of the three last substances in a pure state, it results that the peppery taste comes from the picamare, the agreeable aromatic odour from the capnomore, whilst the eupione, inodorous and insipid, must be regarded as their solvent; but it is the union of these three substances which constitutes the agreeable odour and aromatic taste of the true animal oil of Dippel. Ulterior researches have taught the author, that the best method of freeing it from the principle easily oxydized which it still contains, consists in not collecting more than the sixth part of the oil employed, and to rectify it alone. Besides the substances which have been mentioned, the animal oil of Dippel must also necessarily contain ammoniacal salts, since, during the whole course of the experiment, nothing was employed to eliminate them.

Ann. der Pharm. and Journ. de Pharm.

ART. XLIV.—VOLATILE OIL OF SOME SPECIES OF MELALEUCA, CULTIVATED IN THE BOTANIC GARDEN OF IENA. CONCLUSIONS UPON THE GREEN COLOUR OF THE OIL OF CAJEPUT. By CARL STICKEL, of Iena. Extracted by M. VALLET.

THERE exist among the learned, two different opinions as to the cause of the green colour of the essential oil of cajeput. Some attribute it entirely to the presence of copper; others think that this oil, in its state of purity, of itself possesses a green colour. We will cite among the last MM. Berzelius, and Reinwardt who obtained at Amboina a green oil of cajeput, Nees d'Esembeck, Martius, Leverkohn, Pfaff, and Caventou. A third intermediate opinion may be admitted, which recon-

ciles the two first, and this is the one confirmed by the experiments of the author. In fact the distillation of the leaves of *Melaleuca hypericifolia* and *splendens*, cultivated successfully in the botanic garden of Iena, afforded him an oil exactly like that of the shops as to smell and taste, of a green colour, but paler than that found in commerce. He thinks, then, that the natural pale green colour of this oil can only acquire the intensity of the green colour of the commercial article, by the presence of copper, which he has detected in the latter.*

M. Stickel terminates his notice by the following reflections:—

1. Most probably in the islands of the Indian Archipelago' where cajeput oil is prepared upon a large scale, the Melaleuca leucadendron and cajeputi, or according to the latest researches, the Melaleuca trinervis, (Hamilton,) are not only employed, but also many other species appertaining to the genus Melaleuca, since the M. hypericifolia and splendens furnished to him an oil, which—as regards smell and taste—does not differ from the officinal cajeput oil.

2. The leaves of the species of Melaleuca are the parts of the plants most rich in essential oil. The stems, on the contrary, are entirely insipid, while the seeds have a camphoraceous and burning taste.

3. With time, the green colour of the oil of the species of Melaleuca becomes yellow. One year was sufficient to produce this change in that in the possession of the author.

4. Perhaps it might be advantageous to cultivate these plants for medical purposes, in the temperate countries of Europe, where the temperature does not fall below + 3° to 4° Reaumur (a temperature in which the plants thrive well in the open ground.)

Annalen der Pharm. and Journ. de Pharm.

* These results are perfectly in accordance with those obtained by M. Guibourt, and which are stated in his *Histoire abregée des Drogues Simples.*

ART. XLV.—REVIEW OF THE "REPORT FROM THE SELECT COMMITTEE ON MEDICAL EDUCATION, WITH THE MINUTES OF EVIDENCE AND APPENDIX. Part III. Society of Apothecaries, London. Ordered by the House of Commons to be Printed, 13th of August, 1834."

(*Concluded from page* 171.)

*Supply of drugs.** Both by their Charter and the Act, the Society of Apothecaries were constituted a trading company, and this privilege seems to have been conferred upon them, in order that a supply of pure drugs and preparations might be secured for the public. Much has been spoken and written regarding the superior management of the pharmaceutical department at the Hall; and two chemists are employed to superintend the processes. It would appear, however, that not only do they supply themselves from British manufacturers with various substances of a bulky nature, but that they even decline preparing those articles which, from their cost and composition, are liable to be adulterated, and which it is of the highest consequence,—both to the safety of the patient and the credit of the practitioner,—to have in the purest form possible.

Mr. Field, the Treasurer, who describes his duty to be a general superintendence of the pharmaceutical department, states that the Apothecaries' Company does not prepare nitric, sulphuric, tartaric, and citric acids, which, it is well known, are not made by the manufacturer according to the processes

* The two divisions of the review devoted to the *Education of Candidates* and *Examiners and Examinations* have been omitted, as they embrace subjects more intimately connected with the practice of medicine, &c., than pharmacy, and involve a question of superiority between the English and Scotch schools, matters for which our pages are not sufficiently numerous.

of the Pharmacopœia, and are not in a state of perfect purity. The following quotation will show how far Mr. Field is qualified to take a general superintendence of the drugs and preparations vended at the Hall. It is also another specimen of the inconsistency and contradiction displayed by all the witnesses of the Apothecaries' Company.

"Does your Society purchase any of the articles that it sells from the wholesale druggists? From the wholesale druggists, certainly. Does your Society purchase of the chemical manufacturers those chemical articles, only, which are prepared wholesale by them as articles of general commerce: does it not purchase any preparations of a different description from the chemists? I believe not. How does it provide itself with sulphate of quinine? It all comes from France; it is all manufactured in a wholesale way by the manufacturers of certain articles. How do you account for its being all prepared in France? They prepare it better and cheaper than we can here. Is it the cheapness of alcohol in France that occasions the preparation of the salts of quinine in that country? This is one important cause: I have no doubt but the French are very clever in manufacturing, and they get a better produce from the same thing than we do. Is there not equal chemical knowledge on the part of many individuals in England? They have so large a practice in it, and they have a skill which moderate practitioners have not. Is not sulphate of quinine subject to considerable duty on import? About a penny an ounce, which is merely nominal. What is the wholesale price of sulphate of quinine? About six or seven shillings an ounce. I recollect it as high as thirty shillings.

"Robert Christison, Esq., M.D., Professor of Materia Medica in the University of Edinburgh called in and examined. Is alcohol used in France for preparing sulphate of quinine? I think not, because more than one process has been contrived by the French chemists for preparing it without alcohol. The processes without alcohol are the cheapest?

Yes, and I have reason to believe that some of the processes without alcohol are followed by manufacturing chemists in this country. Can you give any reason why sulphate of quinine should not be manufactured with profit in this country? I am inclined to believe that a large portion of what is used in this country is made in Britain, though not made as cheaply as in France. There may be various reasons for that; among the rest, efficient workmen in that country are cheaper, and a certain degree of chemical knowledge is far more common. I have examined samples from each country with great care, and have found samples manufactured in England equal to the finest sulphate of quinine I ever saw. Have you met with any sulphate of quinine not of the requisite purity? Several times; I know a chemist in Edinburgh who prefers the British sulphate of quinine, because there is a greater certainty of having it pure; for though it is better prepared in France, it is more irregular."

Henry Field, Esq., further examined:—"How does it happen that your Society, possessing a laboratory and complete establishment, such as would be required for manufacfacturing sulphate of quinine, is not able to manufacture it as cheap as they can purchase it? I believe it is owing to the quantity made in France being much greater than can profitably be made here. The English makers do not make it now so cheap as the French. The fact is, that our laboratory would not be equal to the manufacture of a thing of that kind: it requires an apparatus peculiar of itself, of a very expensive description. Is not the process of manufacturing sulphate of quinine one of those refined processes which, especially your society ought to carry on in their own laboratory; in as much as it is an article not manufactured to any extent by the wholesale chemical manufacturer, is very liable to adulteration, and is inefficacious, except in a state of purity? There are not more than two or three manufacturers in England, I believe, who prepare it. Is not that an additional reason why your Society should do so? We attempted it

once, I believe, upon its first discovery; but the difficulties of making it are so great, that the manufacturers of it can do it much cheaper than we can. Do you mean to say, that there is not sufficient skill at your laboratory to prepare this substance with advantage? I am not speaking of skill, exactly; but in France the quantity to be prepared is so large that they can do it better and cheaper than we can. The article prepared in England is not very saleable; for it differs so much in appearance from the French, that the public in general is not satisfied with it. What are the principal articles that are prepared at your laboratory? It is almost impossible to state, there are so many; almost all galenicals or compound medicines, syrups, and pills and a great many chemicals. Do you grind all the drugs yourselves? Yes. Are your preparations better or worse than those which are sold by the most respectable chemists and druggists? They certainly are greatly better than what are sold by chemists and druggists in general: but there are a few persons in London who might be named, and who sell very excellent medicines, and I dare say, as good as ours. We are governed by the pharmacopœia, and in galenicals consider ourselves obliged to make use of every ingredient therein mentioned."

Mr. Field immediately after states, that the processes of the pharmacopœia are not followed in all cases, but that deviations are made whenever it is deemed necessary. Dr. Christison, perhaps the first pharmaceutical chemist of the day, asserts that the French quinine cannot be depended on; but the Worshipful Company refuses to manufacture this substance, or even to vend the British; because, forsooth, the public would rather have it of the French shade of colour. Such are the guardians of medicine in England!

Some questions regarding processes in pharmaceutical chemistry, put to Mr. Field, were very promptly answered by Mr. Hennell, the operating chemist to the Apothecaries' Company. Was the superintendent unable to answer them himself, or was the operating chemist too anxious to show

his knowledge? We know not, but the questions were what a first year's student of the Edinburgh school would have taken no credit to himself for answering.

ART. XLVI.—RESEARCHES ON THE CHLORIDES AND OXIDES OF MERCURY.—By Robert Kane.

It is a long time since the action of ammonia on corrosive sublimate was first noticed, several facts have been established, and all the chemists who have made it their study, have arrived at different conclusions,—and each has proposed his own theory. A more complete examination of this reaction, which might lead to an exact result, was therefore a desideratum.

Ammonia acts on corrosive sublimate in two ways. Grouvelle and Rose have investigated the action of the gas on the dry sublimate, and the papers of Fourcroy, Hennell, Guibourt, Soubeiran, and Mitcherlich, on its action in a state of solution, show the importance these chemists attach to the subject.

A solution of ammonia, poured into a solution of sublimate, produces a milky precipitate which separates slowly, and resembles recently precipitated alumina. If the precipitate be thrown from hot solutions, or if it be well washed, it has a yellow tint. If, on the contrary, it be boiled in the liquid from which it has separated, a very heavy granular powder, of a canary yellow, is obtained.

This white precipitate is insoluble in water. Its apparent solubility is owing to its decomposition, or to its elements entering into new compounds. Heated in a glass tube closed at one end, it is decomposed below a red heat, giving off a

mixture of ammonia and nitrogen, and, at the same time, calomel is sublimed, generally blackened by a little ammonia, from which it may easily be separated. The precipitate is readily soluble in the nitric and muriatic acids. Mixed with potassa, soda, lime or baryta, ammonia is liberated; the mass becomes yellow, but the decomposition is never complete.

The nature of the products will be given farther on; it must be remarked that an alkali, even in excess, never liberates all the ammonia.

The iodide of potassium produces a red precipitate of deuto-iodide of mercury, all the ammonia is disengaged, and the liquid remaining is a solution of caustic potassa. The sulphuret of barium acts in the same way, bisulphuret of mercury being precipitated.

To obtain a perfectly pure precipitate, some precaution is necessary. A cold solution of deutochloride of mercury must be treated with a slight excess of ammonia, the precipitate thrown on a filter and well drained before being washed. It may then be washed with a quantity of water sufficient to displace the first liquid, and this even with great care, for cold water decomposes a small portion of it and its milky colour is lost. Having thus obtained a precipitate which I considered pure, I analyzed it, as the chemists who have studied this compound differ as to its composition. I repeated my analysis several times; and even changed my method of analysis.

1. When a solution of sublimate is precipitated by ammonia, the mercury is contained in the precipitate, and a portion of chlorine remains in solution as sal ammoniac. One hundred grains of sublimate were dissolved in cold water, this solution was decomposed by a slight excess of ammonia, and the precipitate collected and washed on a previously weighed filter; it was dried and weighed with care; the washings were added to the first liquid, the whole acidulated with nitric acid and precipitated by nitrate of silver; the chloride was collected

on a weighed filter and its weight determined. This analysis gave the following results:—

Experiment.	Precipitate.	Chlorine in liquid.
1	91.3	12.6
2	92.4	13.3
3	92.9	13.15
4	95.4	12.7
5	93.4	12.95
Mean,	93.1	13.00

One hundred grains of the sublimate contain 74.09 of mercury and 25.91 of chlorine. Thus the quantity of chlorine remaining in solution was one-half less than that existing in the sublimate; therefore, in 93.1 of the white precipitate, we have 74.09 of mercury, and 12.91 of chlorine.

2. The white precipitate, subjected to heat, gives off gaseous matter, water and calomel. The experiment is thus conducted: a bulb is blown on the end of a tube, which is then weighed, the precipitate is next introduced into it, and its quantity determined by weighing the whole. The heat is applied so as to sublime the calomel without loss, taking care to drive off any water which may have condensed on the sides of the tube; this calomel is black, but on allowing the apparatus to cool in the air and then re-heating the calomel it becomes perfectly white. The tube is again weighed, the loss of weight gives the quantity of water and gaseous matter; the excess over the weight of the empty tube gives the quantity of calomel, and by this we have the quantity of mercury and chlorine.

No. of exper.	Matter used.	Calomel.	Calomel per cent.
1	20.42	18.95	92.80
2	19.42	18.07	92.53
3	12.14	11.28	92.91
4	14.71	13.79	93.68

These results give us for 100 of precipitate a mean of 92.98 of calomel, or

$$(Hg79.14+Ch13.84.)$$

3. The calomel treated by chemical agents, to obtain its mercury, gave in the first experiment 77.3 per cent. of precipitate, in a second 78.1 thus giving a mean of 77.7 per cent.

4. 105.40 of white precipitate dissolved in muriatic acid and precipitated by sulphuretted hydrogen, gave a black precipitate, which was collected on a weighed filter and well washed; the washings were added to the liquid, the whole evaporated to dryness and the residue weighed: the results were 95.23 of bisulphuret of mercury, or mercury 82.17+sulphur 13.06; and 23.57 of sal ammoniac, or muriatic acid, 16.04+ammonia 7.55; or still better, 77.96 mercury+7.16 ammonia (per cent.)

5. 100 grains of the precipitate were put into a phial to which a bent tube was adapted; this tube was placed in weak muriatic acid; a solution of sulphuret of barium was then poured into the phial; heat disengaged ammonia and water; the liquid into which these passed was evaporated to dryness; there remained 21.57 grains, of sal ammoniac or muriatic acid 14.85, ammonia 6.72. The iodide of potassium used in the same way gave for 100 grains 19.83 of sal ammoniac.

6. It has been supposed that the white precipitate contains a quantity of oxygen sufficient to peroxidize all the mercury. Thus far my researches have not led me to this conclusion; for heated in a tube it gives off no oxygen; the oxygen, if there be any, must therefore form water at the expense of the ammonia. To arrive at some conclusion I collected the water, to determine by its weight the quantity of oxygen in the precipitate; some of this was placed in a small weighed retort, to which was fixed a tube containing potassa and unslacked lime, which communicated by another tube with the mercurial trough; the retort was weighed after the introduction of the precipitate, as also the drying tube. The retort was heated until the calomel sublimed. The whole of the water was ab-

sorbed in the tube, and the nitrogen and ammonia collected in a receiver. By my first experiment, I obtained from 22.21 of precipitate 0.22 of water; by a second, 0.14 of water from 20.47 of precipitate. The gaseous mixture, reduced to the desired temperature and pressure, measured 4.24 cubic inches, of which 2.67 were absorbed by water; deducting from the remainder 0.23 for the air of the apparatus, there remained 1.34 per cent., or by weight,

Ammonia, 0.488 gr.
Nitrogen, 0.404.

The following results were obtained by two other experiments:

Experiment.	Precipitate.	Water.	Water per cent.
3	12.14	00.8	0.658
4	19.42	"	"

Which gives a mean of 0.583 per cent. of water; some of this probably arises from the precipitates being inaccurately dried. The mean of my analyses gives for the composition of the precipitate:

Mercury,	78.60
Chlorine,	13.85
Ammonia,	6.77
Water,	0.58
Loss,	0.20
	100.00

The white precipitate is considered by chemists as a compound of one atom of peroxide of mercury and one atom of sal ammoniac.* The great difference in the quantity of mercury sufficiently proves the incorrectness of this theory, besides that my experiments have demonstrated that so large a quantity of oxygen can not exist in the precipitate.

* This white precipitate must not be confounded with the white precipitate of the Parisian Codex; the latter is protochloride of mercury.

Of the powder formed by the action of water on the white precipitate.

It is the general belief that by the action of boiling water the white precipitate is entirely converted into peroxide of mercury: I have never succeeded in performing this experiment; on the contrary, I have found that boiled in water it becomes canary yellow, granular and easy to dry. This powder is not totally insoluble in water; heated it gives off nitrogen, ammonia, water, and a mixture of calomel and mercury sublimed. It is readily soluble in nitric and chlorohydric acids. The alkalies only alter its colour; treated by the iodide of potassium ammonia is disengaged, and a brown powder is produced.

The precipitate from 100 parts of sublimate was thus treated: when it had become yellow, it was thrown on a filter and washed, and the liquid and washings precipitated by nitrate of silver. I give here the mean of several experiments:

Yellow powder 83.83, chlorine in the liquid 18.89.

We thus see that three parts of the chlorine of the sublimate remains in the liquid, and the fourth and all the mercury in the yellow powder.

When white precipitate, already prepared, is boiled in water, a yellow powder is obtained and the liquid above it contains sal ammoniac alone. This reaction enables us to ascertain the composition of the yellow powder. The chlorine of the sal ammoniac was precipitated by nitrate of silver, and its weight determined. Four experiments of this kind gave the following as the composition of the yellow powder:

Mercury,	78.60
Chlorine,	7.56

100 grains of white precipitate, boiled in water, gave 91.15 of yellow powder, and the liquid evaporated to dryness gave 10.23 of sal ammoniac.

Action of an excess of alkali on the white precipitate.

Grouvelle and other chemists assert that an excess of am-

monia produces, in a solution of corrosive sublimate, the ammoniuret of mercury, discovered by Fourcroy and examined by Guibourt.

Dumas says that by treating the ammoniacal precipitate by caustic potassa this ammoniuret is obtained. As my results accord with those of Rose, detailed in his paper, I shall only give the composition of the ammoniuret. Messrs. Rose and Grouvelle have proved satisfactorily that fused corrosive sublimate absorbs gaseous ammonia, and is by its action converted into a white mass, the composition of which is:

$$4(2Ch+Hg)+4NH^3.$$

Action of a solution of ammonia on calomel.

Mr. Hennel states that the result of the decomposition of calomel by water of ammonia is a black powder, containing mercury 96 + oxygen 4.

I have arrived at a different conclusion. Exposed to a heat in a tube, the black powder gave traces of water, nitrogen, ammonia, and a mixture of calomel and mercury; 148.15 grains of calomel boiled with an excess of ammonia, gave 141.92 grains of the black powder, and the liquid acidulated and precipitated by nitrate of silver, gave 44.44 grains of dry chloride.

I repeated this analysis, and give the mean of the two: calomel being a compound of,

$$Hg85.117+Ch14.883,$$

The composition of the black powder is:—

Mercury,	88.91
Chlorine,	7.95
Other substances,	3.14
	100.00

To determine the quantity of ammonia in it, I put 66.48 grains into a small matrass to which was fitted a bent tube,

passing into diluted muriatic acid; iodide of potassium was then added to the powder; on exposure to heat, all the ammonia was given off, and the liquid evaporated to dryness gave 6.96 of sal ammoniac, or 3.36 per cent. of ammonia in the black powder, the composition of which is, therefore:—

Mercury,	88.33
Chlorine,	7.95
Ammonia,	3.36
Loss,	0.36
	100.00

Action of ammonia on peroxide of mercury.

To prepare the ammoniuret of mercury, I precipitated a solution of corrosive sublimate by caustic potassa. The precipitate after being well washed was digested for several days in a phial containing ammonia. Its colour became less deep, but never white. I prepared some, also, by boiling the precipitate in ammonia until it ceased to lose colour. Heat very much assisted the reaction. I used these products indiscriminately in my analysis, but never mixed them. This ammoniuret heated, gives off ammonia, water, and becomes red like the peroxide, but when cooled it loses this colour and is evidently unaltered ammoniuret. This reaction does not consist in the decomposition of the ammoniuret into peroxide and ammonia, for from the commencement to the end of the action, water, ammonia, nitrogen, oxygen, and mercury, are disengaged.

Thrown on a live coal it detonates feebly, much less than fulminating gold; it is readily soluble in nitric and chlorohydric acids.

72.07 grains of it were dissolved in muriatic acid; from this solution, diluted with water, 70.08 grains of sulphuret were thrown down by sulphuretted hydrogen. The liquid evaporated gave 9.21 grains of muriate of ammonia; on the supposition that the mercury exists in the compound as peroxide, we will have in 100 parts:—

Mercury,	83.90
Oxygen,	6.63
Ammonia,	4.07
Water and loss,	5.40

Convinced that this water was a constituent of the ammoniuret, I decomposed 12.38 grains in a small retort, furnished with a tube containing caustic potassa to absorb the water. The weight of the tube was increased 0.67; and the mercury sublimed in the neck of the retort, weighed 10.35. We have thus the following composition per cent.:—

Mercury,	83.62
Water,	5.39
Loss and gas,	10.99

The gases are oxygen and ammonia, the former combined with mercury as peroxide of that metal, which gives.—

Mercury,	83.62
Oxygen,	6.60
Ammonia,	4.30
Water,	5.39

MISCELLANY.

Tannate of Lead.—Autenrieth has recommended this salt strongly in gangrenous states; it especially was beneficial in the case of a girl affected with a nervous fever, whose back was attacked by deep gangrenous sores: it was applied in the form of ointment. The tannate was obtained by precipitating an infusion of oak bark by acetate of lead. The precipitate was collected on a linen cloth and dried. This is the bitannate, which is white. But there are two other tannates: the *neutral tannate*, obtained by boiling the *bitannate* with distilled water; the odd atom of tannic acid is dissolved while the neutral tannate remains; it consists of 65.79 tannic acid and 34.21 oxide of lead. The *basic tannate* is procured by precipitating a solution of tannic acid, or tannate of potash, by disacetate of lead; it is white, but by washing becomes yellowish. Dr. Tott employs the bitannate in the following form:—Dried tannate of lead, 2 drachms; rose ointment, 1 ounce. The ointment is to be intimately mixed, and spread on the sore.—*British Ann. Med.*, June 2, 1837, from *Journ. de Chim. Med.* March, 1837.

Clinical Researches on the influence of certain Medicines upon the functions of the Heart. By H. C. Lombard.—1. *Assafœtida.* M. L. states this to possess remarkable properties in combating the irregularity of the functions of the heart. Employed *externally*, in the form of plaster, it succeeds in alleviating palpitations which have resisted a great variety of medicines. He has almost constantly obtained some alleviation in a great number of cases. Irregular contractions of the ventricles, occurring in persons affected with disease of the heart, are modified; and it likewise succeeds in those cases which may be considered only nervous. The following is the formula used by him: Assafœtida, 2 ounces; gum. ammoniac, 1 scruple; turpentine, 6 drops; yellow wax, a sufficient quantity. Employed *internally*, he has found it likewise to lessen and render regular the movements of the heart. In very small doses, it lessens the palpitations, and produces a remarkable calm; and he considers it a very valuable remedy in nearly all diseases of this organ.

2. *Camphor.*—This medicine, given internally, in variable doses, from three to twelve grains in the day, acts in a special manner upon the heart.

Among persons affected with hypertrophy, with dilatation of the cavities, the nervous influence is often insufficient to produce regular and complete contractions, and hence often tumultuous action. This state he has found can be modified by camphor, and he has seen the most tumultuous ventricular contractions become regular and perfectly isochronous after the administration of a few grains. He is not able to decide whether it acts as a stimulant or a sedative.

3. *Digitalis.*—M. Lombard believes the want of uniformity in the sedative action of this medicine upon the functions of the heart, depends upon the four following circumstances: 1. The state of the stomach; 2, the mode of life of the patient; 3, the doses given; 4, the mode of administration. Sometimes, owing to an irritable state of the stomach, the exhibition of digitalis induces vomiting; and if this continues after the cessation of the medicine, we must not have recourse to antiphlogistic measures, but to antispasmodics; such as the subnitrate of bismuth, oxide of zinc, and effervescing draughts. The mode of administering digitalis is one of the most important points in its therapeutical history. The infusion is the preparation which produces most promptly symptoms of saturation. In the form of powder it rarely produces vomiting, except when the doses are large and frequently repeated. The best medicines for obviating or allaying these symptoms of saturation are calcined magnesia, subnitrate of bismuth, subcarbonate of iron, or oxide of zinc. M. L. considers the subcarbonate of iron as the best, and thinks he can attribute to its use the absence of baneful results among his patients who took digitalis daily for many months.

4. *Polygala Senega.*—The therapeutical action of this medicine is little known. M. Lombard considers it one of the most precious which the materia medica possesses. Administered in the form of extract or infusion, he has found it lower the circulation, and especially regulate the ventricular contractions. The dose employed varied between twelve and twenty-four grains in the course of the day. The infusion, prepared with one drachm to four ounces of water, has been often administered in the same time.—*British and For. Med. Rev.*, from *Bulletin Gen. de Therap.* Nov., 1836.

On the production of Ammonia during the oxidation of Protosulphate of Iron exposed to the air. By M. Sarzeau of Rennes.—For some time past pills have been prepared of a mixture of protosulphate of iron, carbonate of soda, and an inactive powder. An apothecary having occasion to make a mass of this, perceived that it exhaled an ammoniacal odour. He immediately made another mass with new materials; but this time finding no indications of ammonia, he considered its production in the former case accidental. I determined to ascertain if in the oxidation of protosulphate of iron, exposed to the atmosphere, there did not occur a phenomenon

analogous to that observed by Messrs. Austin and Chevalier, during the oxidation of iron under similar circumstances.

I procured several specimens of this salt; all the crystals contained more or less oxide of iron. Pulverized in a glass mortar, and mixed with an excess of caustic potassa, with the addition of a little water, they all gave off ammonia, rarely appreciable by the smell, but rendered very apparent by the presence of nitric acid that did not fume. Ammonia continued thus to be evolved until nearly all the proto-oxide was peroxidized, as was ascertained by occasionally renewing the surface with a pestle. To convince myself that the white vapours, observed in this case, were owing to the presence of ammonia, I treated four hundred grammes of sulphate in a close apparatus, to which was attached a small bottle containing water acidulated with chlorohydric acid. The reaction being completed, the liquid was evaporated; I obtained a notable quantity of a salt which, mixed with potassa, evolved a strong ammoniacal odour. Other specimens of protosulphate, recently prepared, in well formed crystals, and very clear, containing no oxide of iron, were treated in the same manner. They did not immediately give off ammonia, but only some watery vapour, produced by the elevation of temperature of the mixture; as soon, however, as the surface became oxidized, ammoniacal vapours were evolved and continued to be so, as in the other specimens.

We may conclude from these experiments that ammonia is produced by the oxidation of protosulphate of iron exposed to the air, and also when this salt is decomposed by an alkali, being evolved as long as the oxidation continues. *Journ. de Pharm.*

Essential Oil of Potatoes. By M. Augustus Cahours, (L'Institut, No. 199.)—According to Dumas, the essential oil of potatoes is represented by the formula, $C^{20}\ H^{24}\ O^{2}$. M. Cahours infers that this oil is a compound analogous to alcohol and spirit of wood, in consisting of a peculiar compound of carbon and hydrogen for its base, ($C^{20}\ H^{20}$,) united to two atoms of water. He cites the following experiments by himself as proof of the correctness of this view.

The oil treated with sulphuric acid, and subjected to a mild heat, yielded an acid containing the same carburetted hydrogen for its base. This acid formed with bases soluble compounds, whose analogy with sulphovinates is incontestable. The salt of baryta, for example, contained $SO^{3}\ Ba\ O + SO^{3},\ C^{20}\ H^{20},\ H^{6}\ O^{3}$. If the oil is put in contact with iodine and phosphorus, an ethereal substance is disengaged, giving off a slightly alliaceous odour, which is similar in composition to hydriodic ether. With nitric acid and chlorine, it afforded products of analogous constitution.—*Amer. Journ. of Science and Arts.*

Silex.—M. Turpin has submitted the silex sent from Berlin by M. Ehren-

berg, to microscopic observation. The magnifying power amounted to 260, and this gentleman found, that the semi-opal of Berlin is a conglomerate of a number of silicious particles and fragments of organic remains, the colour of which varies from transparent white, and passes through yellow, to the deepest and most opaque brown. M. Turpin recognised four different bodies; the first of which he referred to the genus *Gaillonella* of M. Bory St. Vincent, or *Conferva moniliformis;* the second he considered as a different species of the same genus; the third was a mixture of tubular filaments, divided into cells at rare intervals, and remains of infusoria; the fourth was not organic, but served as a basis for rendering the whole solid. The *Silex pyromaque* of Delitzsch, is much richer in organic productions, offering some very remarkable forms, probably belonging to the eggs of Polypi.—*Athenæum, May,* 1837.

Resolutive effects of Carburet of Sulphur upon indolent tumours.—Lampadius in 1826 extolled the employment of this compound, for rheumatism, chronic gout, paralysis, cutaneous eruptions and burns. Since this period, this liquid has been frequently made use of in the north of Europe. Dr. Krimer has employed it anew with happy results in divers affections, and principally in the treatment of indolent tumours which had resisted all kinds of medications. Under this plan of treatment he has administered internally 16 grains of animal charcoal, mixed with the extract of cicuta; whilst externally he has caused to fall from a certain height upon the tumour, from 40 to 50 drops of carburet of sulphur, repeating it three times daily. The affected part was enveloped during the interval in wool or swan's down, and twice a week warm baths slightly alkalized were directed. This method of employing the carburet of sulphur was completely successful in his hands. The external use of the same compound was equally successful with M. Krimer in the case of a young lady who laboured under goitre.

Finally, in several cases of *strangulated hernia*, the author found that no application so much facilitated reduction as the *carburet of sulphur.* Some drops applied to the hernial tumour, reduced it promptly without any manipulation.

M. Otto, of Copenhagen, has also employed with success, in obstinate rheumatic and arthritic affections, the carburet of sulphur according to the following formula:

Take of Carburetted Sulphur, ʒii.
Spirit of Wine, ℥i.
M.

The patients are to take four drops every two hours, at the same time that frictions are made with the following liniment:

Take of Carburet of Sulphur, ʒij.
Olive Oil, ℥i.
M.

By these means a persistent rheumatic affection of the feet accompanied with swelling of the extremities and knees, was removed in a short time.

Journal de Pharmacie.

Indigo. Sulphindilic acid. Analogy between Alcohol and Indigo as regards their combination with sulphuric acid.—M. Dumas presented a memoir to the Institute, in which he states, that he has repeated the analysis of indigo, and has obtained exactly the same results as those obtained by him five years since. His analysis gives as the composition of indigo :—

Carbon,	73.0
Hydrogen,	4.0
Azote,	10.8
Oxygen,	12.2.

The author has endeavoured to determine the nature of the compound formed by the reaction of sulphuric acid upon indigo. It is known that this acid has the power of dissolving indigo and becomes coloured blue in consequence of this solution. Berzelius considered this combination as a species of lacker. M. Dumas, on the contrary, regards it as a compound analogous to sulphovinic acid ; he names it on this account sulphindilic acid ; it results from the combination of two atoms of sulphuric acid with an atom of indigo.

This acid forms with potassa a salt soluble in water, crystallizable in delicate silky needles, of a deep blue colour; it produces with baryta, a salt little soluble in cold, more so in warm water.

From the analysis of these two salts, it results that the formula for indigo is, $C^{32}\ H^{10}\ AZ^2\ O^2$, and that the sulphindilic acid ought to be represented by $2\ SO_3 + C^{32}\ H^{10}\ AZ^2\ O^2$; by adding to this formula, an atom of bas, that of the sulphindilates is obtained. It is known that when indigo is treated with sulphuric acid, a purple substance is often formed, very difficult to be separated from the blue matter. M. Dumas calls this combination sulphopurpuric acid; it is represented by two atoms of indigo and two atoms of sulphuric acid, or of sulphindic acid, plus an atom of indigo. It forms with potassa a purple salt, soluble in water.

White Indigo.—M. Dumas has analyzed the white matter into which indigo is transformed, when submitted to the action of alkalies and reductives; he has found in it the same composition as in indigo itself, with the difference of nearly two atoms of hydrogen which white indigo contains in addition. Hence it is a hyduret of indigo, and not indigo deoxygenized as is generally believed.

Anilic Acid.—This name has been bestowed by M. Dumas upon an acid formerly called indigotic, obtained by the reaction between nitric acid

and indigo. This acid has nearly the same radical as indigo, and is represented by $C^{28}\ H^{8}\ AZ^{2}\ O^{9}$.

Picric Acid.—This is the last product of the action of nitric acid upon indigo, most generally designated by the name of Bitter of Wetter. It is composed, according to Dumas, of $C^{24}\ H^{4}\ AZ^{6}\ O^{13}$.

M. Dumas thinks that an oxide of azote enters into its constitution.

Ibid.

Physiological operation of Indigo.—In almost all patients, the use of indigo is succeeded first by squeamishness and vomiting, though the substance itself be tasteless and inodorous. The violence of the emetic efforts appears to be regulated by the individual irritability of the gastric nerves of the patients. Females vomit more readily than males. The vomiting is at first continuous, that is, during the continued use of the agent, and often so violent that the indigo must be given up; but after several days it ceases. It has otherwise the peculiarity that the contraction of the abdominal muscles and the diaphragm is much less violent, and the debility is less considerable than after vomiting induced by other means. The contents of the stomach present nothing unusual, even in respect to taste, only they are of a very dark blue colour, and the fluid is intimately mixed with the indigo, from which it may be inferred that the gastric juice contributes very much to the digestion of the indigo.

Diarrhœa, the second physiological effect of indigo, takes place in general first when the vomiting ceases; yet from this many patients remain altogether exempt. In general, diarrhœa, when once commenced, continues as long as the patients take the indigo, and increases in intensity during the continued use of the remedy. The motions are generally soft, semifluid, and of a dark blue-black colour. The vomiting and diarrhœa are frequently accompanied with slight colicky pains in the stomach and bowels, which, however, may be so violent as to require the indigo to be given up. Those patients who are exempt from vomiting, appear to be attacked with more violent colicky symptoms. By the continued diarrhœa there is formed a species of gastrosis (irritation of the mucous membrane of the stomach and bowels,) with a loss of appetite, headache, and giddiness, and sometimes the sense of dazzling lights in the eyes.

The third physiological operation of indigo is seen in the urinary secretion. The urine assumes a dark violet colour, deepest in the morning. On the quantity of the urine the agent seems to exercise no influence.

Dr. Roth did not observe colouration of the sweat. But it is remarkable, that one patient, after the use of indigo for several weeks, fell often into slight convulsions, similar to those which ensue on the employment of the nitrate of strychnia.

The dose of indigo is regulated by the irritability of the stomach. It is best to begin with grains, and rise gradually to drachms, or even several ounces daily. Dr. Roth gives the preference to the form of electuary, with proportional additions of the aromatic powder, or Dover's powder, as correctives. In the formula employed in the Hospital of the *Charité*, at Berlin, half an ounce of powdered indigo, rubbed up with a few drops of water, is mixed with half a drachm of aromatic powder, and one ounce of simple syrup, and to be taken in divided doses in the course of the day. Many even take from a half to two ounces, twice and four times daily for the space of several months.

In what manner indigo operates, and to what class of medicines it belongs is very difficult to determine, and certainly cannot be inferred from its constituent parts. Probably its active principle is seated in the peculiar colouring matter. Though in many respects the operation of indigo is similar to that of tartar emetic, yet this attacks more forcibly the energy of the organism. In all the patients, after the use of indigo the spasms were at first more frequent and more intense, but shorter in duration; but after some weeks their intensity was manifestly abated, and at length they entirely disappeared. All the patients cured by indigo laboured under idiopathic epilepsy, that is, epilepsy without symptoms of organic lesion. Among those who were improved were several idiopathic and symptomatic cases. In one case of epilepsy, which ensued after a remarkable contusion of the head, after the employment of indigo, a moderately long intermission took place. A boy of 16 years of age, who had laboured for eight years under St. Vitus's dance, and then was attacked with epileptic spasms, was cured of all the symptoms by the use of indigo for six weeks. Of twenty-six epileptic patients treated by means of indigo, there recovered—four males and five females; three males and eight females were improved; and four males and two females remained uncured. In confirmation of the foregoing inferences, the author communicates the history of two cases, in which the treatment by means of indigo operated beneficially, after other means had been unavailing.

Edinburg Med. & Surg. Journal, from *Neue Wissenchaftliche Annalen.*

Mode of Detecting Acetate of Morphia.—Drantz, Laine and others, recommend for the detection of this salt in the intestines, that the latter should be macerated in distilled water, the liquid filtered, and evaporated to the consistence of syrup. This extract, when treated by alcohol, gives up acetate of morphia, which may be obtained in the state of crystals by evaporation.—*Journal de Chim. Med.*

Iodide of Quinine.—This is formed by precipitating sulphate of quinine by means of hydriodate of potash. It is a yellow precipitate, soluble

in alcohol, and crystallizes from this solution in quadrangular prisms. It is a good deal used for the cure of scrofulous tumours, in cases where iodine and tonics are indicated.—*Ibid.*

Pyrophori of easy formation.—M. Vallet has extracted from the Journal fur Praktische Chemie, an account of these combustible compounds. It is known that when two and a half parts in weight of pure dry tartaric acid, deprived of its water of crystallization, and reduced to powder, are rapidly mixed with eight parts of peroxide of lead, in a dry capsule, an ignition of the whole mass results in a little time, which is very vivid and of long continuance. This fact which was first mentioned by Walker, led to the supposition that other organic acids might exhibit the same reaction with peroxide of lead. M. Botliger has repeated the experiment with oxalic and citric acids, and has found that the action of the first upon the peroxide of lead was more prompt, if not stronger than that of tartaric acid, and that of citric acid was feebler. Thus by mixing together 5.25 parts in weight of peroxide of lead with one part of oxalic acid dried by heated air, or containing 19 parts of water of crystallization, an instantaneous ignition of the mass took place, but of less duration than with tartaric acid, because the oxalic acid contains less carbon than this last. In order to obtain a pyrophorus with citric acid, it is necessary to mix promptly at a temperature of from 18° R. one atom of citric acid, previously melted and kept some time in fusion, then dried and pulverized, with two atoms of peroxide of lead. The ignition of the whole mass is as vivid and of as long continuance as with tartaric acid. Minium, litharge, and carbonate of lead mixed with this last acid, equally afford pyrophori according to this author, but not so good as those obtained with the pure oxide.—*Journal de Pharmacie.*

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ORIGINAL COMMUNICATIONS.

ART. XLVII.—INTRODUCTORY LECTURE DELIVERED IN THE CHEMICAL HALL OF THE UNIVERSITY OF MARYLAND, October 31st, 1837. By William R. Fisher, M. D., Professor of Chemistry and Pharmacy. Graduate and Associate Member of the Philadelphia College of Pharmacy.

(Communicated for the American Journal of Pharmacy.)

Gentlemen:—

Called, unexpectedly, by the appointing power to which the interests of this institution are confided, to discharge the duties of the chair of Chemistry and Pharmacy; and introduced suddenly from the walks of private life to a station in which the incumbent is required to announce phenomena and facts which have engaged the attention and occupied the labors, of a Thenard, a Berzelius, and a Davy; and to expound the principles, which the sagacious minds of these distinguished masters of the science have drawn from the classification and arrangement of these facts, it may be naturally imagined that I approach this chair with mingled feelings of awe and diffidence—of awe inspired by the sublimity and perfection of nature's works, as exhibited by their demonstrations; and of diffidence of my own ability to follow where they have led. The path which they have pointed out for

their successors, though defined and regular its course, and ornamented with the beauties of order, simplicity, and harmony, is yet steep in its ascent; and the traveller who fain would pursue it, is limited in his rambles and restricted in his journey by the exact and unerring rules of demonstration.—No brilliant hypotheses may captivate his fancy; no creatures of imagination are allowed to people his domain; he is bound, with the exactness of mathematical science, to the observance of facts, and is compelled at every footstep to regard with undeviating precision the landmarks which bound his track. His pilgrimage is soothed, however, by the knowledge, that every fact he acquires is one that may be subsequently available in explanation of some apparent novelty; and that this fund of information when once obtained, will be of essential advantage to him, through whatever walk of life his course may be subsequently directed: for the science which this Chair is especially called upon to teach, mingles its observations and researches with the most humble as well as the most exalted conditions and operations of either human or natural creation. It regards with interest the domestic operations of the matron, in the preparations for her daily food; as well as penetrates with a piercing inquiry into the crater of the volcano, the vast crucible of nature herself; and it finds upon reducing the contents of this great laboratory to their simplest elements, that they compare in identity with the elements which constitute the insignificant material upon which that matron exercises her culinary skill.

Great, however, as may be the diffidence which attends my introduction to this hall, and humble as may be my efforts to give interest to the themes which have occupied the illustrious names already mentioned, so inspiring is the subject itself, that, divested of all artificial aid, its principles and phenomena conveyed to the hearer in the most plain and unpretending style, must win his regard, captivate his feelings, and secure his affections.

Satisfied, then, that the merits of the subject must command attention, I enter on the discharge of the duties of the Chair

with the less reluctance, and pledge myself to bring to its support an industrious, enthusiastic attachment for the science.

The sciences of Chemistry and Pharmacy, have universally been held of primary importance in the education of an accomplished physician, but they have unfortunately been regarded by society at large as limited in their operation, to the wants of that profession. Ignorant of the benefits which have daily accrued to their comfort and health, from the skilful administration and exercise of these sciences, mankind have suffered their knowledge of them to sleep in obscurity, in a period of unusual thirst after knowledge, and been satisfied to learn that these subjects received a degree of attention from those who cultivated the healing art. We think, however, it may be shown that every member of the community has more or less interest in these too commonly estimated abstruse studies; and, remote as they seem to be from domestic happiness, that they are nearly allied to it.

The material which gives its hue to the fabric that decorates the fairest of creation's works; the application of fuel, and the mode of applying it for household purposes; the investigation and improvement of the manufacture of bread and soap, all owe their existence to the display of affinities ascertained by chemical philosophers, and must derive their improvement and consequent perfection from a regard to the principles ascertained and promulgated by them. When Sir Humphrey Davy found thousands of his fellow creatures perishing from the explosion of fire-damp, in the deep, dark recesses of the mine, and contrived the ingenious apparatus which would, for ever after, shield them from its pernicious and devastating effects, no chance came to his aid to direct him in its construction. Certain well established and demonstrable principles were endowed by him with a local habitation in the safety-lamp, and his name became identified with the instrument destined to prove a powerful philanthropic agent in arresting misery and averting death, from the head of many a helpless fellow creature. No less distinguished for the adaptation of chemical principles to the wants and comforts of mankind, was the in-

vention of the electric conductors, by our own FRANKLIN, by which the destroying bolt was arrested in its course, and diverted through a channel in which its energies became confined, and were rendered powerless.

These facts, when dwelt upon, are calculated to arrest the mind of the observer, and to induce him to regard with interest, subjects which he may have previously considered as entirely abstract and unconnected with himself; but let him proceed from these, and follow in his mind the various tradesmen and artificers, in the pursuit of their daily toil, and he will scarce fail to discover in each some application of chemical science, by which their labours are accomplished, or the product of their hands improved.

In extracting and reducing the metals from their natural combinations, or ores, so that they may resume their individual properties of malleability, ductility, and tenacity, chemistry has rendered an aid to mechanical science, without which it could scarcely have had an existence. The agriculturist who improves his lands, and is enabled to renew their vigor when exhausted by repeated cultivation, is equally indebted to chemistry, for a knowledge of the materials of which his soil is composed,—in what it is deficient, and how that deficiency may be supplied. The navigator has been taught, by the inductions of chemical philosophy, how the copper sheathing with which his vessel is protected may be rendered and preserved bright; and a powerful mechanical agency has recently been put in motion, which, from the representation of those who have witnessed its operations, bids fair to rival the expansive force of steam itself,—owing its development and even existence to the investigations and experiments of chemists. Chemistry has shown that the simple immersion of two metallic surfaces in a weak acid solution, generates a heat that has been found capable of fusing the hardest substances, and of causing the combustion of platina itself, one of the most fixed of all the metals; that the same simple combination, reduced in size, and immersed in a weaker solution, gives out an energy, that when properly applied, creates a magnetic force requiring a powerful exertion to overcome

it, capable of sustaining tons in weight; and the steam engine itself, that mighty agent, giving to man the power of a giant, was incomplete, and would probably have been abandoned, had not the genius of WATT applied the means of suddenly depriving the steam of all its expansive power, by the adoption of a simple contrivance, to which he was directed by a knowledge of the fact, that this expansive power was due to the latent heat within it, as likewise discovered and taught by the celebrated BLACK, Professor of Chemistry at Edinburg.

Who that has enjoyed the security and comfort derived from the brilliantly illuminated streets of a city, when he is told that the production of the elastic fluid, which is consumed to afford the lamp that lights his path, could never have been accomplished without the aid of chemistry, can withhold from that science the character which I claim for her, of being intimately connected with domestic comfort and happiness?

The consideration and examination of all these facts, is calculated to show the importance of a knowledge of chemistry in promoting, and creating a thousand conveniences, which characterize civilized society, and of winning for her devotees the respect and veneration of all who are made acquainted with her advantages and allurements. But when applied to the relief of suffering humanity, exhausted on the bed of sickness, or prostrate from the maddening influence of pain, bereft of reason, through disease, or burning with the heats of fever, then, indeed, is chemistry a ministering angel.

Who that has enjoyed the delights of calm repose, obtained through the aid of anodynes, after days and nights of sleepless wretchedness; who that has allayed the parching thirst of fever, and experienced the relief afforded by the effervescing draught, has ever dreamed of awarding to chemistry her full share of credit for the relief thus opportunely obtained?

It is by recounting some of these facts, and apprising you of their existence, that I trust to be enabled to show you how great have been the contributions of chemical science to the supply of your different wants, and the alleviation of your sufferings, and to convince you how essential is a knowledge of its

principles to every member of society, more especially to those who have the preservation or restoration of the health of that society in their charge.

From every source capable of furnishing information or yielding products available to the use of man, chemistry has drawn her resources; and, in her estimation, the most apparently worthless substance is held with a regard equal to that with which she appreciates the diamond. In her eyes they are both regarded as elements employed in the formation of the material world, whose characters and properties it is her province to investigate; whose affinities she is called upon to discover and record, and whose combinations possess an interest in proportion as they manifest more or less intricacy and harmony. To her view

> "All are but parts of one superior whole,
> Whose body nature is—and God the soul."

Strange as it may appear, and unexpected as may be the enunciation, the fact is nevertheless true which chemistry has ascertained, that in the fabrication of the vast universe by which we are surrounded, and of which we form so insignificant a portion, nature has employed but fifty-one or fifty-two elementary substances; and that all the various forms under which matter presents itself to us, owe their existence to the infinite variety of combinations of these elements among each other. The material composition of the body of man, the lord of the creation, is precisely identical with that of the flowers of the field and the stones of the quarry; each containing in its due proportion the elementary bodies known as oxygen, hydrogen, nitrogen and carbon, united with other substances necessary to produce and sustain its structure, or in other words, to endow it with its appropriate form.

The beautiful system of laws regulating and controlling all the combinations, developed by the chemical philosophers of the present century, exhibit the prevalence of the most perfect order and symmetry in the formation of all the compounds of which the universe is composed. Rough and misshapen as the form may be, in which many an aggregate presents itself

to us, yet in its interior arrangement, in the manner and proportion in which its integrant particles are united, there is as much symmetry, harmony, and regularity of proportion, as in the most finished architectural structure that art can design or erect.

How great, then, must be the interest inspired by the study of a science, which is capable of unfolding the beauty and regularity concealed in the rugged mass of granite lying in the quarry; and with what intense anxiety must the experimenter watch a process that is about to develope some new revelation of an unknown reality, crowning, perhaps, the pyramid which he has erected upon the basis of observations acquired during years of previous toil! Numerous are the instances in which a general principle has required a century for its development. Facts have accumulated upon facts, and been regarded as mere isolated entities, until a master spirit has arisen, at whose command they have all arranged themselves in order; apparent incongruities reconciled themselves, and a law whose existence has been coeval with the creation of the world, been adduced, to the astonishment of those who had never conceived the possibility of its existence.

The discovery of the laws regulating the formation of compounds from their simple elements, was of this character. Various facts respecting compound substances had been observed and recorded; speculations had been entered into respecting the causes of the phenomena observed; additional facts were accumulated, when soon after the commencement of the present century, the genius of DALTON conceived the idea of arranging all these phenomena, and deducing from them the circumstances under which they were exhibited; happily for the science, his effort was successful. He succeeded in demonstrating, that these combinations were perfect harmony and order themselves; that the measure of their proportions could easily be ascertained, and that when ascertained, could be applied as the measure of all future combinations of the same elements.

A Saxon chemist had previously shown the positive identity

of every compound in which the same elements were united in the same proportions, and this fact formed the basis of Dalton's theory, not to say the basis of the science itself. The discovery of this law puts the whole material world within the grasp of the chemist, and enables him to describe the structure and composition of a whole aggregate, forming, perhaps, a mountain chain, from the bare examination of minute and inconsiderable fragments. Aided by a knowledge of the affinities which one element has for all others, no composition is so complex as to bid defiance to his powers to separate and discover its integral components; and when his task is completed, he is satisfied that he possesses a knowledge of the composition of that body, wherever existing, in whatever form, or under whatever latitude it may be found; whether beneath the frozen skies of the artic circle, or fanned by the orange-groves of tropical climes.

These facts are referred to, to show, that in the investigation and discovery of the materials of which the surface of the earth is composed, no ordinary degree of intellect is required deliberately to weigh, and compare, causes and effects, phenomena and their attendant circumstances; and that no mind, however superior in its endowments, can conceive its powers misused or misapplied, when devoted to such a cause as the pursuits of chemistry are thus shown to be.

It is my purpose now to recal your attention from this stupendous fabric, an appellation to which I consider the science honestly entitled; and from the regard of its application to the development of the structure of immense masses, to direct you to some of its humbler duties, wherein its utility is no less apparent, nor less conducive to the happiness and health of mankind. The science of Pharmacy, which may be considered as embraced in this sphere of its operations, is one to which too little attention has hitherto been paid. Exceedingly humble and unpretending in its details, its operations are as closely identified with the well being of society, as those of any other profession; but the few splendors attendant on its successful cultivation, have as yet proved not sufficiently

alluring to induce the entrance into its ranks of many competitors for the simple rewards which it has to offer; consequently, public attention has, in this country, not been sufficiently awakened to an idea of its importance, and influence on the comforts of society.

It is the offspring of civilization, and can only exist in highly civilized communities: like the great science of medicine itself, of which it constitutes a no unimportant branch, the application of fixed principles for its practice, was, during the early ages of barbarism, entirely neglected and unnoticed. The savage in his native wilds, was satisfied with the application of a few bruised simples to a wound produced in the conflict or the chase, or in the administration of some simple infusion or tea, to assuage the paroxysm of fever. Beyond this culling of simples, he neither knew, nor cared, nor indeed was there probably occasion, for all the remedies which have since been introduced to our notice. In that primitive condition of existence, disease much less frequently manifested her powers; and the few ills which did afflict humanity, were perhaps capable of being relieved by these simple agents. But, as population increased, and civilization advanced, remedies were required which exceeded in complexity the bruised herbs and infusions of the early ages; and from the employment of vegetables alone as remedial agents, recourse was had to the mineral substances also provided by nature for our use. In the application of these to the wants of society, chemistry was called in to bestow her aid, and many of the preparations at present of established reputation in medicine, were the results of processes invented and pursued hundreds of years ago. At that period chemistry itself was but little better than empiricism; and adventitious circumstances attending the production of some compounds, were supposed seriously to influence their effect; while from a want of the knowledge of principles which have since been discovered, many important requisitions for their production and efficacy were entirely neglected and disregarded. Chemistry, however, was making rapid advances to the character of a sys-

tematic science, and along with her improvement was a corresponding amendment in the remedial agencies put at the disposal of the physician; and with the perfection which chemistry has now attained, perhaps, all the advantages to be derived from this application of her principles and precepts, are realized. But the extension of these has now become so general, and the importance of a thorough knowledge of their application become so great, that the cultivation of these laws, and their use in the preparation of medicines, has, in the division of labor which characterizes civilization, been erected into a separate science, and this is entitled PHARMACY. Its name is taken from the Greek word Φαρμηκον, signifying a medicine, and its operations consist in investigating the physical and chemical properties of substances used in medicine; in selecting those parts of vegetables, and preparing those compounds of minerals, which are best endowed with remedial powers; in so modifying their natural form, as shall render their powers most available when required for use; and finally, in discovering all those circumstances by which their powers may be impaired or improved. To undertake a conscientious discharge of duties so important requires an education far above the common standard; a thorough knowledge of chemistry; an acquaintance with botany, and an inflexible honesty of purpose, which will suffer no prospect of pecuniary advantage to arrest for a moment a strict discharge of all these duties with fidelity.

Great as is the dependence of the invalid on the skill and judgment of his medical attendant, for a correct diagnosis of his complaint and subsequent advice, as to the remedial agents necessary for him to have recourse to, equally great is his dependence on the honesty, skill and abilities of the pharmaceutist, to whom is intrusted the preparation and dispensation of those means which have been indicated by the physician, as essential to his relief and recovery. Should the remedies which are furnished on the physician's requisition, have become inert through age, or been impaired by a want of proper skill in their preparation; should, as has unfortunately too frequently occurred, one sub-

stance be furnished for another; should a greedy desire for gain, induce the supply of a medicine inferior from any cause, the health of the patient may receive a shock, from the effects of which the skill of the ablest physician may be unable to save him.

The importance which is attached to a proper exercise of this profession, and the high degree of responsibility involved in its functions, have induced all the governments of Europe to prevent, by the enactment of strict penal laws, any of these abuses which might otherwise have crept into it. The education of their pharmaceutists, is required to be carried to a high degree of attainment; boards of examination are established to prevent incompetent persons from intruding their services on the community, and censors are appointed whose duty it is to make a thorough examination and inspection of all the medicines submitted for sale or dispensation. Such as are found impure, deteriorated, or improperly prepared, are immediately confiscated, and a penalty is inflicted on the delinquent, besides the ignominy which attaches to a public exposure of his disgrace.

In some of the German cities, but a limited number of pharmaceutists are allowed to dispense medicines, and the inducement to enter into a competition, which may deteriorate their materials for the sake of enhancing their profits being thus removed, the only incentive remaining is, to attract employment by the offer to furnish the best supplies. In France, the same scrupulous regard is paid to the cultivation of a proper knowledge of pharmacy; and although the number of those who may practise this art is not limited by law, as is the case in Germany; yet numerous regulations exist designed to promote the interests of the profession, secure the rights and health of society, and to elevate the character of the profession by requiring from its members a thorough education in every department of science, allied in the least degree with pharmacy.

Unfortunately for the profession in this country, the law takes no cognizance of its character or duties. The

spirit of our institutions is averse to the establishment of privileged orders, and although the advantages would be decidedly in favor of that community, which was protected by the enactment of wholesome laws, prescribing the regulations under which this science should be practised, yet the conferring of an exclusive right to prepare and dispense medicines on those who alone are qualified for it, would be regarded as creating a monopoly for the benefit of a favored few. The spirit of open competition is allowed to run riot through the land, even in the exercise of a profession requiring equal skill, and a knowledge almost co-extensive with that expected in the education of a physician, and the health and lives of the community are exposed to the chances of frequent detriment, from the consequences which may result from an incompetent or ignorant discharge of the duties of a pharmaceutist. Poisons are openly and undisguisedly furnished to children and servants without fear or restraint, and no kind of inspection is practiced to determine officially that the medicines administered on the requisition of a physician, are either perfect of their kind, or prepared according to acknowledged authority. Is it not a strange, not to say a negligent oversight, that legislators should direct a careful investigation into the quality of the most common articles of merchandize, and yet suffer agents employed in the refined and delicate operations of medical practice, to pass without notice? And that the means of procuring the lasting illness or painful death of a valued member of a family, should be suffered to be dealt out without restraint, while the public press resounds with indignation at the practice of wearing weapons about the person? An open evident means of destroying life, against which the assaulted person may raise an arm in self-defence, arouses the clamors, and excites the interests of the whole community, while the silent, stealthy, insidious venom, against the operation of which no care can guard, no caution escape, no skill avert, may be instilled into the cup of festivity, or mingled with the food which hospitality provides, without any legal enactment

to put it beyond the reach of the demoniacal spirit disposed to avail itself of its powers.

The importance of a regard to the prevention of this abuse to which society is constantly exposed, has been forcibly and fatally illustrated by a case which has occurred within the observation of several of my auditors, since the preceding reflections were written. A member of a family has been laid a victim, to the habit of employing arsenic for the purpose of killing rats. Had the proper police regulations existed on this subject, which obtain in all other countries, the helpless sufferer might have been still in existence, about commencing a life of usefulness; and the unfortunate cause of the accident have been spared the remorse which must attend the consciousness of having unintentionally caused the death of a fellow creature.

Society has no idea of the many risks encountered, nor of the many evils to which it is exposed, from the want of a proper regard to legislative restrictions on the practice of this profession. Nor has it a competent idea of the importance of encouraging a class of well educated, skilful manipulators in this department of the social economy.

To illustrate the character which this science has acquired abroad, and the high standing which its adepts occupy, I desire to call your attention to the annexed extract, which is taken from a remonstrance by the Pharmaceutists of Paris, addressed to the Chamber of Deputies, on the occasion of some abuses having crept into the profession. "The knowledge," say they, "which pharmacy requires, without being as extensive, is in part the same as that which is necessary to the physician. It is as various, and is sufficiently useful to entitle him who possesses it to the particular protection of government, and to general respect. The pharmaceutists enrol in their number men of distinguished learning, who belong to the most celebrated academies, skilful professors who fill the chairs of chemistry and natural history, writers whose works are sought for in France and abroad, respectable citizens whose public services have been rewarded by honours, titles and

decorations." To enumerate the names of Vauquelin, Pelletier, Robiquet, Henri, Planche, and Virey, is to justiy, to its fullest extent, this warm eulogium on the characters of those who have cultivated pharmacy in France.

Alas for our native land, she has no list of worthies to compare with those enumerated; nor, indeed, with hundreds of others less distinguished in the annals of fame. "The particular protection of government and general respect," have, on her soil, offered no incentives to men of genius and education to engage their services in the profession, which abroad has won " titles, honours and decorations," and provided chairs of distinction for its disciples.

The only improvements which have arisen in this country, have been the result of voluntary, spontaneous efforts on the part of the pharmaceutists themselves. Ashamed of the condition in which their profession existed, and stimulated to the exertion of rendering themselves and pupils better qualified to minister to the wants of society, means have been adopted which, though slow and gradual in their inception, have taken deep root in the soil, and must, at no very remote period, yield a harvest that will amaze by its productiveness, and will nourish by its excellence, those districts in which its growth and maturity have been attained unnoticed. A sentiment of honest pride arouses itself within me, while thus acknowledging the warmth of my attachment for the science of pharmacy; and I reflect with lively satisfaction upon the honors now, for the first time, bestowed on a graduate of an American College of Pharmacy, in the person of the present incumbent of this Chair. It bespeaks an era about to commence, in which pharmacy will receive her due share of protection, and the general respect of the community; when her votaries will no longer be regarded as mere venders of medicines, and when she will receive her proper location among the liberal professions.

Having indulged in these encomiums on pharmacy, and introduced the evidence of the French Society to assert the claim of that science to notice and cultivation, I feel bound to

show that my encomiums have not been misplaced, nor that the respectable representatives of the Paris Society have over estimated their own importance or utility. To prepare and dispense with propriety and ability, the medicines required for the renovation of health; to study their chemical and physical properties, so that the good may be distinguished from the bad, and the perfect from the imperfect; to devote a life to the study which is requisite to keep pace with the rapid advance of knowledge of this age; and to discharge, honestly and faithfully, their duties to their compeers and the medical profession, should, in my opinion, qualify those who do discharge these several duties, and do possess these requirements, to as high a regard in the estimation of the public, as any other class of society is entitled to. And here I might rest their claims; but I found their demands to respect and protection on specific benefits which have been conferred by the science, which, when enumerated, will, I think, justify what has been said.

The advantages to be derived by society from the uniform and defined preparation of medicines, furnished to the sick in precisely such form and activity as is prescribed by the physician, (not the least conspicuous among the benefits derived from pharmacy,) are sufficiently obvious to impress upon the mind some share of her claims. But independent of that, which is doing no more than pharmacy acknowledges as a duty, for the discharge of which she asks no favours, I will point with satisfaction to the discovery and application of the chlorides of lime and soda as disinfecting agents, which constant domestic use has now familarized to every household; and which have become as necessary aids in promoting cleanliness and comfort, as the use of any of the agents habitually applied to that purpose. In their uses as medicines, the practitioner of medicine will admit the many important benefits derived from them; and the helpless sufferers who have been relieved from the pains and disgusting attendants upon a class of diseases by no means unfrequent, or uncommon—a class for whose relief, these remedies appear to have been almost especially provided—bear me witness to their efficacy and utility.

These chlorides have procured health and comfort for the inmates of crowded ships, and dispelled the apprehension of a disease among them in tropical climates, at whose approach the stoutest stood aghast, and reflecting on the prospect of death, may be imagined to have uttered,

> " Take any shape but *that*, and my firm nerves
> Shall never tremble."

The discovery and perfection of the process employed for producing these compounds, was the result of the skill and intelligence of a pharmaceutist of France, LABARRAQUE, whose name has become celebrated from having been identified with these substances which his science and industry introduced to the notice of the medical profession, and to the domestic use of society at large.

The discovery, by analysis, of the composition of vegetable substances, and the determining of the fact that their remedial powers resided in an active principle, capable of separation from the great bulk of woody fibre in which it was enveloped, was the result of pharmaceutic enterprise and talent.

This discovery has opened a new branch of science for the labours of the present generation, and has materially changed the therapeutic system as formerly established and taught. The system of the patient is no longer overloaded with an immense amount of inert matter, in order that he may receive the benefit to be derived from an infinitely small proportion of active matter associated with it. Who that has his recollections awakened of spoonfuls of nauseous dry powder, at which the stomach revolted, forced upon him in the shape of bark, can withhold from pharmacy the merit she claims of having separated from that same bark the beautifully crystallized element which gave it all its powers, and which was capable of producing in a dose " in shape no bigger than an agate stone," all the beneficial effects for which the bark had long been celebrated. In many cases it so happened that a vegetable provided by nature with a principle which gave it an ability to do good, was, at the same time, invested with

a principle to do harm, and hence its use became either altogether prohibited, or at least it was a matter of accident, whether, in particular cases, the good or bad principle might prevail in its influence on the system; of such a character is opium, so constantly and extensively employed in the practice of medicine. It is a matter of general notoriety, that the use of opium, in many cases, is utterly precluded, from the occurrence in it of two principles, as above described. The soothing, calming influence, which it is capable of exercising, being, in some constitutions, entirely overruled, and its effects counteracted by the stimulating, exciting power, with which it is also provided by nature. Pharmacy, by discovering the existence of these two principles, and designating the process by which they may be separated, has conferred an invaluable boon upon the comforts of the sick, and has provided, through the skill of the medical practitioner, the means of procuring the calm of "nature's sweet restorer," without arousing the debilitated nerves of the sufferer into a state of anxious and thrilling excitement. There is, perhaps, no more beautiful example of the operations of pharmacy, than the process of separating morphia from opium. This process it will be hereafter my duty to describe and explain; at present, a bare allusion to it is all that is in my power.

The separation of quinia from bark, morphia from opium, strychnia from nux vomica, and, indeed, of numerous other active principles, has led to the introduction of a new mode of administering medicines, in which the patient is spared the fatigue and nausea attending the ordinary practice of swallowing his dose. By a process termed the *endermic* mode, these active principles are introduced into the system, and their effects are manifested just as when taken into the stomach; according to this mode they are applied either in the form of an ointment, or dry powder sprinkled over a small spot from which the skin has been removed by the action of a blister; and, in some diseases, more success has attended the endermic method of treatment than that formerly pursued. It enables the action of the medicine to manifest itself directly

upon the diseased part, and of course is more rapid in its effects than when compelled to travel the whole circuit of the circulation before reaching that part which requires its aid.

One of the chief advantages which attends our knowledge of the presence of these active principles in vegetable remedies, and of the means by which they may be separated, is, that we are at once furnished with a prompt and certain mode of ascertaining the qualities of vegetable medicines. For since it has been proved that all owe their efficacy to the presence of some one of these, it is evident that their powers are in direct proportion to the amount of the active principle which they are found capable of furnishing. Hence, in making choice from different portions of opium, in order to select that which is best, we naturally prefer that which produces the largest amount of morphia; the same reasoning will apply to bark from which the separation of quinia forms the criterion by which the judgment is formed; and the quantity of atropine, or hyoscyamine, obtained from the plants in which these principles exist, enables us to decide whether the leaves which furnish them, are entitled or not to our confidence.

In a word, Pharmacy has applied to vegetable substances the same unerring test for estimating their value to which general chemistry had already subjected mineral bodies. The amount per cent. which may be yielded, in both cases, being the direct measure of their value. This object is, alone, one of primary importance, and cannot too often be made available in the successful prosecution of the duties of a pharmaceutist and physician.

But Pharmacy has by no means limited her investigations to those which have been announced; she has directed her attention to the improvement of the processes by which the extractive matter of plants is removed from them and converted into a form, by which its efficacy is preserved unimpaired, and may be employed long after the plant which furnished it has mingled with the dust. She has discovered and invented hundreds of modes by which the form of medi-

cines has been improved, and has simplified formulæ applying to their construction the beautiful and systematic proportions developed by the laws of combination.

I have now, I trust, made out a case proving to your satisfaction, that Pharmacy is equally worthy the cultivation of enlightened minds, with her parent Chemistry; and, I trust, that with the medical class certainly, if with no other portion of my auditors, no further comment will be required to invite an enthusiastic devotion to the course of study, required to embue their minds with her principles, and familiarize their hands with her practice.

Situated as the large body of the practitioners of medicine are in this country, in remote situations, beyond the reach of those who make pharmacy a distinct object of study, it is incumbent on them to possess such a knowledge of that science as will qualify them to judge of the quality of their raw materials, and enable them to prepare the officinal and magisterial formulæ, required for the relief of their patients. They cannot place too high a value on this department of their education; for no one can realize the importance which may attach to the purity of a vegetable powder, or the unimpaired strength of a blister. Employed at a moment when the contest between disease and vitality has brought the fluttering soul almost to the period of dissolution from her material abode; when anxious friends and distressed relatives look with intense anxiety to the effect of every remedial means employed, the impurity of a medicine administered in a minute dose, or the failure of a blister carelessly or inefficiently prepared, may decide the contest between life and death; and, with the liberated soul of the departed friend, may vanish all confidence in the skill of the physician. How awful, then, the consequences which attend the preparation and administration of medicines to the sick, and how high are the responsibilities assumed by those who undertake their preparation and direct their use;—a career of distinguished reputation just dawning on the young aspirant for medical honour, may be suddenly arrested, and all his prospects

destroyed, by the failure of any of his remedial means through inefficiency or impurity.

The consideration of these responsibilities, and of the means by which the risk of their being brought home upon you for redemption may be avoided, is an important subject for reflection; and I think I do not magnify the importance of it, when I address these appeals to your understandings and feelings. It shall be a constant object of solicitude with me, while I have the honour to hold this Chair, to maintain, with what ability I possess, the importance of a thorough knowledge of Pharmacy, as a branch of medical science, and a requisite in medical education; and I shall endeavour to present its details in such an aspect, during the course which is to follow, as will, at least, enable you to appreciate their value and qualify you for their practice.

To obtain a thorough knowledge of Pharmacy, requires a knowledge of Chemistry, which is required in the formation of a medical education by various other considerations; one of the principal of which may be said to be the selection and preparation of proper antidotes to the various poisons, which may be introduced into the system, and threaten life with destruction. All proper antidotes depend upon their chemical properties for their efficacy.

Called suddenly to the bedside of the sufferer, who may be the victim of accident or design, the medical practitioner, who is perfectly familiar with laws of affinity and combination, is never at loss for an agent which will neutralize or destroy the potent energies of the substance which "pours its leprous distilment" into the system of his patient. No loss of time in the application of his remedies is to be apprehended; a cause which not unfrequently tends to the accomplishment of the effects of the poison. Calmly and philosophically he learns the name, or judges by the symptoms, of the enemy which is in deadly conflict with vitality, and possessed of a thorough knowledge of chemistry, he is at once enabled to counteract its effects by decomposing its structure, or by reducing it to such a condition as will entirely change its

character. On the other hand, he who is ignorant of the means by which these changes in its character may be effected, employs his antidotes at random, or suffers the early moments to be wasted, while he is acquiring the necessary information, during which period the agonized sufferer is gradually perishing from the power of the venom, "which shuts up sense, and o'er his inmost vitals creeping," finally overcomes by its prowess, and secures a victim, if not to ignorance and poison, at least to poison which ignorance was incapable of counteracting.

The prevention of disease is equally an important object with the physician, as its removal when formed, and a knowledge of chemistry is indispensable to the full understanding of public hygyene. The diagnosis of disease is frequently aided by chemical agencies, and there is a class of diseases in which it is almost impossible to form a correct diagnosis, without an aptitude at chemical manipulation, as well as knowledge of chemical principles and affinities. Situated remotely from the residence of practical chemists, the practitioner of medicine is frequently called upon, in courts of justice, to furnish testimony in cases involving the greatest responsibility and intricacy. The life and death of the prisoner, his acquittal or conviction, rest upon the fiat of the medical witness. How exceedingly important, then, that that witness should possess, in a thorough knowledge of chemistry, the means by which he may be enabled to pronounce his opinion with certainty, his mind unembarrassed with the reflection that he may, through ignorance, have the responsibility of an unjust verdict laid to his charge. The recent application of the galvanic fluid to the cure of disease, renders a knowedge of that subject important to a physician; and, finally, it may be said, that a complete medical education cannot be attained without extensive acquirements in the science of Chemistry.

It is deemed unnecessary to delay you longer with an enforcement of the claims which the chemical and pharmaceutical sciences have on your attention, and even on that of so-

ciety at large. Enough has been said, it is believed, to show that their operations are directly and indirectly involved in the interests and comforts of every class of the community. Their connexion, in many instances, has been pointed out, and some important results have been shown to depend upon their exercise and cultivation.

It remains, therefore, only to acknowledge the important responsibilities, which are assumed by the occupant of this Chair who has undertaken the duty of inculcating subjects fraught with so much interest and importance. The responsibilities of a public teacher, at all times deep and momentous, are in this case particularly imposing. Flattered, however, by the choice of the trustees, and encouraged by the opinions expressed by many friends who are deemed capable of advising, the present incumbent undertakes the duty with a full sense of the difficulties he is about to encounter; but trusting to your clemency as critics, and relying upon the partiality which has called him to the Chair for an indulgent regard to his fallibility, he embarks upon the extended sea, before him.—Demonstration his sheet anchor—the experience of his predecessors his pilot—your ultimate success in the attainment of Chemistry and Pharmacy, the haven to which his course is directed—and the polar star toward which all the results of his industry and solicitude centre, *the professional reputation of the* UNIVERSITY OF MARYLAND.

ART. XLVIII.—PHARMACEUTIC NOTICES. No. XIV.
By AUGUSTINE DUHAMEL.

Vinum Secalis Cornuti. Ergot is given in powder, infusion, or decoction. Our Pharmacopœia does not recognise any officinal preparation of this substance. For the purpose of administering it in an extreme state of division, and with a view to its preservation in a convenient form, it has been recommended to be given in tincture, which is commonly prepared and kept by druggists. The strength varies from one to eight in different shops.

The formula of Dr. DEWEES, by whom it was principally used, is eight ounces of ergot to a pint of rectified alcohol, with the addition of one ounce of cinnamon bark. But as the highly stimulating property of the vehicle here employed, has been in some cases found objectionable, and a better substitute suggested in the preparation of a wine imbued with its virtues, I would recommend, for the sake of uniformity, an adherence to the formula here proposed, which so far, and it has been a long time used,—has given general satisfaction.

Take of Ergot in coarse powder, ℥ij.
Teneriffe wine, Oj.
Macerate for 14 days, and filter.

Tinctura Saponis Camphorata. The authors of the Pharmacopœia have not particularized the quality of soap to be employed in the preparation of the liquid opodeldoc. In making this liniment, in pursuance of the direction indicated by the formula of the United States Pharmacopœia,—"Take of soap, &c."—I made use of the American white soap, and the consequence was a formation of the solid opodeldoc; regarding the proportion of soap as an error, I then added a quantity of alcohol equal to that first employed, which gave me a tincture of soap, though not a permanent preparation, for being put aside, there was a constant and gradual precipitation

of stearine, which rendered it necessary to perform frequent filtration. This at once reminded me that the American soap was made with animal fat, while, if I had used the Castile soap, which is made with olive oil, the like difficulty would not have ensued.

Iodic Solutions. Mention having been frequently made to me, by physicians, of the imperfect manner generally followed in preparing LUGOL's Solution of Iodine, or their prescription of iodine and hydriodate of potassa in solution, it may be deemed advisable to remind those unaccustomed to manipulate with iodine and its preparations, that to carry into effect the desire of the physician, they must triturate the dry substances first with a few drops of water only, until the iodine is completely dissolved, and afterwards add the requisite quantity of water, instead of the common practice of throwing these ingredients into a mortar and pouring upon them the prescribed quantity of water at once; or as some do, after weighing the ingredients, put them into a vial and fill it up with water. Simple agitation in a vial, of these substances, with but a *very few drops of water*, may answer the same end; but the manner is unpharmaceutic. Unless the mode indicated be pursued, a portion of iodine will always remain undissolved.

Effervescent Magnesia. This saline aperient commonly known in connection with the name of its inventor, as "MOXON's Aperient Effervescent Magnesia," has enjoyed considerable reputation from its peculiar gratefulness to a fastidious stomach, as a remedy in Indigestion, Heartburn, Nausea, &c. The manner here indicated is that by which a preparation very similar to the original article may be made. It is the imitation of Mr. E. DURAND.

Take of Carbonate of Magnesia, one part.
Sulphate of Magnesia,
Bi-Carbonate of soda,
Tartrate of Soda and Potash,
Tartaric Acid,
} of each two parts.

These ingredients must be perfectly dried by expelling the water of crystallization, then reduced to powder, and finally mixed together. Enclose in dry bottles, with good corks adapted to them, and seal with wax. If there be the least moisture contained in the mixture, carbonic acid will be generated, and bursting of the bottles will follow. *Dose.*—A tea spoon full in half a tumbler of water, drank in a state of effervescence.

Mother Ointment. Onguent de la Mere Thécle, so called from having been first used by an old nun of that name, and known otherwise by the terms, *Brown Plaster, Brown Ointment,* &c. is an emollient and suppurative preparation, much employed in France as an application to boils, &c. Its reputation and use there, being co-extensive with the domestic application to boils in this country, of a salve made of equal parts of brown soap, and much used in the nursery. It is thus prepared:

Take of	Olive oil,	lbs. ij.
	Semivitrified oxide of lead,	lb. i.

Put these substances in a metallic vessel over a gentle fire: mix and stir incessantly with a wooden spatula until the mixture carbonizes and assumes a dark brown colour, disengaging a thick black smoke. This stage of the operation requires particular care, as the mixture puffs up with violence, and is highly inflammable. To this add the following mixture, previously melted and strained.

Lard,	lbs. ij
Suet,	lb. j.
Yellow wax,	lb. $\frac{3}{4}$.
Black resin,	lb. $\frac{1}{2}$.

When the whole is incorporated, pour the mixture into a proper mould, made by simply turning up and securing the

edges of a sheet of paper, which upon cooling will present a flat cake, which may be cut up into pieces of convenient size.

Opiates. Divers are the preparations of opium, holding, more or less, some of its various principles in solution. Among them are those, with the proportionate activity of which, we are made familiar from the almost daily habit of using them. Others there are, so rarely employed, that we cannot always recall to mind the exact quantity of opium they contain. I have arranged the following synopsis, to show at a cursory glance what is needed; and, at the same time, assist the physician in a choice of *opiates.*

Preparations.	Opium to the oz.	Quantity considered equivalent to 1 g. opium
Syrup of poppies, Lon. Dub. Ed. analogous to	1½ gr.	
Elixir Paregoric, U. S. E. D., contains	1¾ "	
" " Bateman's	2 "	
Syrup of opium, French,	2 "	
Solution of sulph. Morphiæ, 1 gr.,		80 minims.
Ammoniated tincture of opium,	8 "	60 m.
Theriaque andromaque, Fr.,	8 "	60 grs.
Confection of opium, U. S., L. D.,	14¾ "	36 grs.
Black drop, U. S.,	32 "	15 m. or 20 drops.
Laudanum, U. S., L. D. E.,	37½ "	14 m. or 28 "
Dover's powders, U. S., .	48 "	10 grs.
Wine of opium, U. S.,	60 "	8 m. or 10 "
Sydenham's laudanum,	68 "	7 m. or 20 "
Magendie's solut. Morphiæ, 16 grs.,		5 m.
Vinegar of opium, D.,	120 "	4 m. or 5 "
Rousseau's laudanum,	137 "	3½ m. or 6 "

Chloride of Zinc. This powerful escharotic has been brought into high repute lately, from the good effects experienced by its application as a cautery in cancer and ulcerous affections. It is applied by means of a moistened hair pencil.* This salt is prepared by dissolving zinc in small fragments in hydrochloric acid, and evaporating to perfect dryness; it may likewise be prepared by distilling in a retort a mixture of 100 parts of bichloride of mercury and 12.5 of granulated zinc. It

* Mixed with an equal portion of oxide of zinc or sulphate of lime.

sublimes, and is collected in the superior part of the vessel. Chloride of zinc is presented in the form of an uncrystallizable mass, of an opaque white colour, having a strong and disagreeable taste. It is deliquescent, and very fusible, from which circumstance it has received the name of *butter of zinc.* It fuses at about 100° C., becoming, upon cooling, at first viscous, then solid. At a red heat it sublimes, and when conducted in the open air its volatilization diffuses vapours of a pungent odour, having irritating properties. From its ready attraction of humidity this salt should be enclosed in well stopped bottles.

Hints to Physicians in Prescribing. To reiterate the oft urged injunction, not to neglect matters apparently trivial where human life is concerned, may come with seeming ill grace from one connected with medicine only by a knowledge of its kindred branches of Pharmacy and Chemistry, especially when addressed to those whose improved minds have embraced a wide extent of information. But some there are, whose multifarious duties render them neglectful of the minutiæ of prescribing; others from a limited knowledge of the laws of combination, prescribe chemical agents incompatible with each other, and defeat the objects they have in view; and to solicit some attention to these considerations may not be without some profit to the sick—and as concerns ourselves in a less degree, relieve us from an irksome task to which we are sometimes subjected, in the preparation of incongruous mixtures. Frequently *Muriate of Mercury* is prescribed, meaning sometimes calomel, at other times corrosive sublimate, and is put up according to the discretion of the apothecary. This should not be; errors might easily occur; the terms *mild* or *corrosive* should always be superadded, and if they are not, even in infinitesimal doses—calomel should be given unless assured otherwise. This forms but one of many instances. Mineral substances embrace such a range of combination, differing materially in their properties, that they should be particularized so as to leave no room for doubt.

With reference to the vegetable kingdom, the wines of colchicum will serve to illustrate our views: the wine of the seed is said to possess a marked difference from that of the root, yet from a general inattention to this circumstance, we are seldom led to discriminate.

With regard to manipulation, some physicians. with a proper deference to the skill of our apothecaries, direct their prescriptions to be put up *secundum artem*, while others tax our ingenuity to make a good preparation, in following their instructions. Mucilage of gum arabic affords a good exemplification. As simple as it would appear, yet there is nothing appertaining to pharmaceutic handiwork, that is attended with less success, or is so difficult to beginners, as the preparation of mucilage of gum arabic, with the view to the suspension of oils, balsams, &c. It rarely happens that the proper quantity of gum is prescribed, and not unfrequently much more than necessary, which renders it as difficult to make a fine mixture as the employment of too little gum. Sometimes half an ounce of gum, and even one ounce is directed for the suspension of four or eight drachms of copaiba in an eight ounce mixture, of which for a like quantity of mixture one drachm is sufficient, provided there be not too large a portion of spirituous preparations in the composition.

Substances are often prescribed as vehicles for the administration of some active substance, which are wholly inadequate for the purpose—for instance, camphor, strychnine, and other vegetable alkaloids, to be made into pills with crumb of bread; resinous substances with gum, and extracts with essential oils, &c. To enumerate all the inaccuracies, and to say why these are inappropriate, or what are proper substitutes, would occupy more space than the limits of this Journal would permit. These few observations, hastily embodied, are sufficient to show that our learned and respected coadjutors are liable to errors, and may remove from us the censure to which we are sometimes exposed, from the utter impossibility of making elegant preparations, according to ill directed prescriptions.

ART. XLIX.—PURIFICATION OF COTTON OIL.

THE purification of cotton oil is of such vast importance for this and the countries where the cotton plant is cultivated, that frequent endeavours have been made to render this oil useful in domestic economy, but these have invariably proved abortive, in consequence of the experimenters making use of processes employed for a long time in the clarification of certain oils of Europe, whilst the oil of cotton differs materially from all other oils. It is useless to try to purify it thoroughly. Indeed the quantity of *elaine* is so much less than the proportion of *stearine*, that it gives to this oil an almost butter-like consistence, which alone presents an obstacle to its use in affording light. Independent of this, the impure oil of cotton, such as is received from Natchez, contains a very considerable quantity of mucilage, and also carbon, which still increases its density.

After several trials, I have come to the conclusion that it is necessary to separate the *elaine* from the *stearine* to render the oil combustible; an object which can easily be attained by adding, to a given quantity of oil, a sufficiency of boiling alcohol to dissolve the greater part. Decant, and submit to distillation without awaiting its becoming cool. The alcohol always carries off from the mass a little colouring matter, which gives to the *elaine* a brownish tint, but which may be easily removed by treating it anew with alcohol, and filtering the oil through coarsely bruised animal charcoal. As to the *stearine* forming the residue, by adding certain proportions of yellow wax and plumbago, it may be used as a composition for greasing carriage wheels. It may likewise be saponified, and an impure soap made. At first sight, this process may seem costly, but it is easy to perceive that at each distillation scarcely one-tenth of the alcohol is lost. With an advantageous profit, this oil can then be passed over to commerce at a price far below that of the spermaceti oil.

DR. JAMES TRUDEAU, of New Orleans, and latterly a resi-

dent of this city,—a young gentleman ardently devoted to scientific pursuits,—has communicated the above valuable information, which must be of exceeding interest to our cotton planters of the South.

Usually, the seed is employed only for feeding cattle, which, before the extraction of the oil, they will not eat, but the cake, after expression, they are very fond of. Hence the oil is lost, although considerable expense has been incurred in the attempt to make it serviceable, as a substitute for fish oil, in illumination. This object can be effected on a large plantation, where there are slaves, by the construction of a very simple apparatus, in connection with a still for furnishing alcohol at a comparatively trifling cost.

A. D.

ART. L.—SOME REMARKS ON THE OIL OF WILD CHERRY BARK.—By William Procter, Jr.

The science of vegetable chemistry has been making rapid advances within the present century, and though yet in its infancy, we have every reason to believe that, at no distant period, it will be reduced to fixed laws of action, as in the more perfect divisions, styled inorganic chemistry.

The recent discovery of Liebig and Wohler, of the constitution of the oil of bitter almonds, and its relation to benzoic acid, proving the existence of a compound *radical* capable of union in atomic proportions with the simple non-metallic bodies, and of being transferred from one to the other, is a brilliant example of this gradual advancement.

The analogy which exists between the sensible properties of the oil of cherry bark, and those of the oil of bitter almonds, (see *Jour. Phila. Col. Pharm.*, vol. vi.,) led me to suspect a similarity of constitution, and it was upon this conviction that the succeeding experiments were undertaken. How far

this analogy is correct, may be seen in the sequel; and I have no doubt, that time will prove that all those vegetable products of distillation in the form of oils, which hold hydrocyanic acid in solution, are alike constituted.

The oil obtained from the *bark* of the Prunus Virginiana, seems to pervade the whole plant, and to be particularly abundant in the kernels of the fruit; but owing to its association with a fixed oil, it is more difficult to isolate.

The first notice of this oil will be found in an inaugural dissertation on the Prunus Virginiana, by Stephen Procter, (see *Jour. Phila. Col. Pharm.*, vol. vi.,) the object of which appears to have been to demonstrate the presence of hydrocyanic acid.

Experiment 1.—One pound of recent wild cherry bark was submitted to distillation in a glass retort, with sufficient water to prevent empyreuma, and the operation continued until the odour of the oil ceased to be perceptible in the product. It had a milky appearance and smelt strongly of hydrocyanic acid, which, in connection with oil, it held in solution. This was returned with another pound of the bark into the retort, and again distilled; which process was repeated until six pounds of the bark were consumed, being careful to remove the oil from the bottom of the water in the receiver, each time, previous to its being decanted. This liquor was found upon examination to be strongly charged with hydrocyanic acid.

The oil, as obtained above, has a light straw colour, which becomes deeper by age, a powerful odour, resembling that of bitter almonds, and a very pungent taste. It is inflammable, and has a density of 1.061. It is slightly soluble in water, to which it communicates odour and taste, very soluble in alcohol and ether, and its alcoholic solution is rendered lactescent on the addition of water.

Its effects on the animal economy are strikingly powerful, having all the characteristics of the oil of bitter almonds. One drop of it was put upon the tongue of a cat, which pro-

duced convulsions, contortion of the spine, and, in a short time, total loss of power over the posterior parts, and great general prostration, swelling of the neck, and stiffness. These symptoms gradually passed off, and in half an hour the cat recovered, much exhausted. These are evidently some of the principle symptoms of prussic acid, as noticed in the books.

Experiment 2.—A portion of the oil of cherry bark was mixed with a compound solution of potassa and proto-chloride of iron, and briskly agitated, in order to abstract the hydrocyanic and benzoic acids from the pure oil, with which they are associated. This mixture was introduced into a retort, and heat applied, until all the oily matter passed over, together with some water. The contents of the receiver was then mixed with half its weight of dry carbonate of potassa, and again submitted to distillation. The product was perfectly transparent and colourless, but was associated with a little water, which was highly charged with it, and from which it was afterwards entirely separated. This oil is more limpid than the original, does not darken by age, has a specific gravity of 1.046, has the odour of the original oil, (though not so intense,) and a burning aromatic taste. It is partially soluble in water, very soluble in alcohol and ether, and from its solutions in these latter is precipitated by water. When suddenly heated in an open vessel, or what is better, when dropped on iron heated nearly to redness, it inflames, and gives off much carbonaceous matter, but it may be passed through a red hot glass tube without decomposition, condensing in its original form.

From the above description, it may readily be seen that the purified oil of the Prunus Virginiana, is *identical* with the hyduret of benzule, (purified oil of bitter almonds,) of Liebig and Wohler,* which is constituted of a peculiar compound radical called benzule, whose symbol is Bz., and hydrogen.

* An. de Ch. et du Ph., vol. li., p. 273, &c.

	Atoms.			
Thus Carbon	14×6.12	$= 85.68$	C.	106. 68 Bz. + 1 Hyd. = 107.68 Hyd. Bz. yields 1 eq. Hyduret of Bz.
Hyd.	$5 \times 1.$	$= 5.$	H.	
Oxyg.	$2 \times 8.$	$= 16.$	O.	

Experiment 3.—The purified oil (Hyd. Bz.) was heated with an equivalent quantity of hydrate of potassa, and a little water, until it was entirely taken up. Upon evaporating this solution, crystals having the characteristics of benzoate of potassa, were obtained. The re-action here is such that the water of the hydrate yields oxygen to the benzule to form benzoic acid, which then unites with the potassa, and two equivalents of hydrogen are liberated.

Experiment 4.—A portion of hyduret of benzule in a glass capsule was suspended in an atmosphere of oxygen. At the end of twelve hours crystals were perceptible, and by further exposure the whole mass crystallized and lost its odour of bitter almonds. The re-action here was such, that the hydrogen and benzule severally absorbed an atom of oxygen forming water and benzoic acid, which combined to form one equivalent of crystallized benzoic acid.

Nitric acid does not dissolve hyduret of benzule cold; but by a gentle heat it is readily taken up, and deposited on cooling. If the heat be carried too high, decomposition takes place, and deut-oxide of nitrogen is evolved.

The pure oil of wild cherry bark, by exposure to the air, is converted into crystallized benzoic acid by the absorption of two atoms of oxygen.

The last two experiments are almost a repetition of LIEBIG and WOHLER's, and very decisively mark the constitution of this oil; and it is to its ready absorbtion of oxygen, that the presence of benzoic acid is due in the original product.

Experiment 5.—Oil of wild cherry bark (as above) was introduced into a small glass retort, and a bent tube inserted tightly through the tubulure, with the other end attached to a vessel in which chlorine was generated. Upon displacing the atmospheric air in the retort, by chlorine, the oil rapidly absorbed the latter, increased in temperature, and evolved

hydrochloric acid gas, which was formed by the union of chlorine with the hydrogen of the oil. The resulting liquid had a yellow colour, owing to the presence of free chlorine, which, upon the application of heat, regained its colourless appearance. This compound has a very irritating odour, affects the eyes, and has a very pungent taste. It is readily soluble in alcohol and ether, and its density is between 1.9 and 2. Its boiling point is quite elevated.

If, when this compound is at its boiling point, small pieces of sulphur be dropped into it, they continue to be dissolved until one-fourth of the weight of the liquid is taken up. Upon cooling, the sulphur is deposited in minute crystals. During the action of chlorine on hyduret of benzule, if the absorbtion be allowed to go on to saturation, a deep yellow coloured liquid results, which, after standing some hours free from exposure, becomes a mass of acicular crystals of the same colour. These fume powerfully on exposure, irritate the nose and eyes. Whether this article is a new compound,—say a bichloride, or whether it is simply a mixture of the chloride and chlorine, remains to be determined.

Experiment 6.—A portion of bromine was added to hyduret of benzule, contained in a glass vessel. The temperature of the mixture increased, and combination was effected.

By the application of heat, the free bromine and hydrobromic acid formed by the union of bromine with the hydrogen of the hyduret, were driven off; and the liquid, which was of a brown colour, became a mass of foliated crystals on cooling. This compound has a peculiar odour, different from either of its constituents, a rank pungent taste, soluble in alcohol and ether, and deposited in crystals from its solutions by evaporation.

Experiment 7.—A portion of chloride of benzule was introduced into a tube retort, and an equivalent quantity of iodide of potassium mixed with it. On heat being applied, a brown liquid passed over into the receiver, which became solid by standing. When deprived of free iodine, (according to Liebig and Wohler,) it is colourless. This compound has a hot burning taste, a peculiar odour, and dissolves readily

in alcohol and ether. It is readily inflammable, and burns with a bluish flame.

Experiment 8.—A cyanuret of benzule was obtained, by distilling together a mixture of chloride of benzule and cyanuret of mercury. It is a yellow coloured liquid.

Experiment 9.—A portion of chloride of benzule was put in a small glass vessel, and ammoniacal gas, previously deprived of moisture, passed through it. The instant that the volatile alkali and chloride came in contact, the latter assumed a white colour, and presently became nearly a solid mass, which, according to Liebig and Wohler, is hydrochlorate of ammonia and benzamide. By water, the former is dissolved, and the latter isolated. The quantity obtained was so small as to prevent all characteristics (as ascertained by its discoverers) from being carried out, except two, viz., that it is soluble in boiling water, and that by boiling with potassa ammonia is evolved, and benzoate of potassa is obtained by evaporation.

Benzamide differs from benzoate of ammonia only in containing one atom less of hydrogen; for it is evident that during the action of ammonia on chloride of benzule, that one equivalent of hydrogen, either of the benzule or ammonia, is necessary for the conversion of the chlorine of the chloride into hydrochloric acid, in order to form hydrochlorate of ammonia. It may, therefore, be called either a compound of benzule with dinituret of hydrogen, or of ammonia with a compound of carbon, hydrogen, and oxygen, differing from benzule in containing one atom less of hydrogen.

Its discoverers say that benzamide bears the same relation to the benzoate of ammonia, as oxamide does to oxalate of the same alkali; because the addition of one equivalent of water converts it into benzoate of ammonia.

Oxamide is formed by the decomposition of the oxalate of ammonia by heat, but benzamide cannot be thus generated, because benzoate of ammonia is a volatile salt.

That the deleterious properties of the wild cherry oil are due to hydrocyanic acid is evident, because the purified oil

(hyduret of benzule) has no sensible effect on the animal economy, other than the disgust manifested at the disagreeable taste; and, from the activity of the former, this acid must exist in considerable quantity.

From the foregoing statements, it appears evident that the oil of the Prunus Virginiana is very nearly identical with the oil of bitter almonds; for not only is this the case in its sensible and toxicological properties, but in its chemical compositions. Liebig and Wohler state, that neither the oil nor its accompanying acids pre-exist in the almond; and, if not, the question arises in what state does the benzule and cyanogen exist in the almond, and, consequently, in the bark. The recent almonds, as also the bark, possess the odour of hydrocyanic acid, but when dry, are entirely void of it; hence we are led to the opinion that benzule and cyanogen do reside in the bark, but in what state of combination we are unable to say. Benzule has never been obtained in a free state, hence we know nothing of its properties as an isolated substance. But as it is possessed of considerable permanence, and may possibly be entirely void of odour, it may exist in combination with some substance, other than hydrogen, in the dry bark, which compound may not have any aroma.

Therefore, the most plausible theory is, that benzule and cyanogen do pre-exist in the bark of the Prunus Virginiana, which, by the decomposition of water, are converted into benzoic acid and hyduret of benzule, on the one hand, and hydrocyanic acid on the other.

TACCA OCEANICA.

chman & Duval

ART. LI.—ON A NEW SPECIES OF TACCA.

By Thomas Nuttall, Esq.

*Tacca *oceanica,* maxima, foliis palmato-quinque partitis coadunatis, laciniis palmato-multifidis acuminatis, ultimis trifidis; involucrum foliolis lato-ovatis sublobatis breviusculis.

Habitat. In rich shady woods, towards the mountains in Tahiti, and probably other of the Friendly Islands, as well as in Wahoo, Owyhee, and Atooi, of the Sandwich group.

Description. The root consists of numerous yellowish white skinned tubers, scattered over with eye buds like so many potatoes, and are, in fact, scarcely distinguishable from the roots of that common vegetable; from these arise in the summer season, clusters of tall spreading palmately divided smooth leaves, from two to three feet high, of which length the foot stalk forms two-thirds or more; the leaf itself extends out to the breadth of eighteen inches or two feet, and is divided into three primary divisions, and two others which are lateral, or come out above the base of the side divisions; these principal divisions are divided very much in the manner of our red oak leaves, or pinnatifid towards the base, and more or less dilated, and three-lobed beyond; each of the principal divisions again inclining to be three-lobed, except the central one, which is usually pinnatifid as well as terminally three-lobed; all the divisions end in acuminated points, and are, below, every where confluent into each other, down to the primary divisions or summit of the footstalk.

The leaves are, probably, possessed of some degree of succulence, but the vessels beneath present a strong, almost pinnated outline. The scape or flower stem, in the only specimen I possess, is very stout, and rather more than three feet high, attenuated towards the umbel,—whose involucrum consists of about two series of broad, ovate, acute, and sometimes slightly three-lobed leaves, which appear to have been white, or some brighter colour. The umbel consists of numerous longish pedunculated small brown, or brownish

red flowers, nearly campanulate, and consisting of a calyx only; within there are six hooded petaloid pedicellated bodies, answering both the purpose of petal and filament, each containing, and almost concealing (as in the infertile anthers of the larkspur) the two celled anthers. With the berry and germ I am unacquainted. As in the T. *pinnatifida*, there are interspersed among the flowers numerous abortive filiform peduncles, which form a crinite tuft extending far beyond the flowers.

The root of this plant, or the tubers, when pounded and washed, afford a fecula, which, under the name of *Pea*, is used extensively in the Sandwich Islands as an article of food, and goes among the white residents, usually, by the name of Arrow-root.

The present species is readily distinguished from that of India, by the broader, more divided, and coadunate leaves, as well as by the short and broad leaves of the involucrum; it is also, apparently, a larger plant in all its parts, save the flowers.

NOTES ON THE TACCACEÆ, BY THE EDITOR.

The genus Tacca was originally placed in the order Aroideæ, but it differs very widely from all its co-ordinates, and has some points of resemblance to the Aristolochiæ, as was noticed by Brown, *Prodrom.* between which two orders it seems to hold an intermediate position. It has, on this account, been regarded by later botanists as the type of a separate new order, called *Taccaceæ.*

The genus Tacca is thus characterized: Perianth superior, of one leaf, in six deep, eliptic, oblong, equal, converging, permanent segments. Carolla, none. Filaments six, opposite to the segments of the calyx, into whose base they are inserted, and half as long, equal, dilated, flat, oblong, incurved, and vaulted at the summit, anthers sessile in the hollow of each filament, of two distinct lobes. Germen inferior, roundish,

style short, cylindrical, with three furrows, stigmas three, spreading, dilated, cloven. Berry, ovate, angular, of one cell. Seeds, numerous, ovate, striated, inserted into three receptacles annexed to the coat of the berry. *Brown.* The regular pedunculated campanulate six cleft flowers, with six stamens concealed in petaloid appendages, and disposed in an involucrate umbel, with an inferior germ of six angles, &c., prove its near affinity to the *Liliaceæ,* approaching, even though vaguely, to the genus Brodiæa; while the foliage, habit, and roots, bring it back again to the Aroideæ. It belongs to *Hexandria Monogynia*, L.

The name Tacca, was employed by Rumphius, and adopted by Foster. The species described by the latter, is the

Tacca pinnatifida. It is stated to be a native of the East Indies, Cochinchina, the tropical part of New Holland, and the Society Islands, and was carried to England by Captain Blight, in 1792. The root is tuberous and perennial. Leaves one or two, radical, on long stalks, erect, deeply three cleft, with deeply and variously pinnatifid acute entire lobes, a foot long, smooth, reticulated with veins. Footstalk hollow, smooth. Flowerstalk radical, about three feet high, hollow, erect, unbranched, terminating in a simple umbel of several drooping, green, somewhat glaucous flowers,—accompanied by an involucrum of about as many upright partly pinnatifid green leaves, near two inches long, with a greater number of much longer thread-shaped bodies, suspected by Mr. Brown to be abortive peduncles. The berries are black, larger than a gooseberry, but little juicy when ripe.

Foster states that the fresh root is intensely bitter and acrid, though somewhat milder when cultivated. By being grated and repeatedly washed in fresh water, it yields a very white, mild powder, like starch, which is dried in the sun and then serves for food; either in the manner of salep, or baked into cakes, which are even better than those made of sago. It has been called Otaheite salep. This root is also applied as a plaster, for deep wounds made with darts or other weapons.

The article which is known as Sandwich Island arrow-root,

from the want of positive information, has been hitherto supposed to be derived from this plant; but during the recent visit made by Mr. NUTTALL to that island, he discovered that it is obtained from the species of which he has furnished us with an account,—at the same time, it may be that both species are to be found among the islands of the Southern Pacific. The difference between the two plants may be understood by comparing the descriptions, and from the summary of the points in which they disagree, made by Mr. NUTTALL.

Sandwich Island arrow-root is a rare article in the American market. It has, however, been introduced; it is stated that a large quantity was some years since brought to the United States. Its properties are the same as those of the Burmuda, possessing equal whiteness and purity, if the same care be taken in its preparation. We are informed by Dr. RUSCHENBERGER, of the United States Navy, who has just returned from the Pacific, that he preferred it as nutriment for the sick on board the Peacock, to the ordinary arrow-root. It is sold in the Island at about six cents per pound.

SELECTED ARTICLES.

ART. LII.—OBSERVATIONS ON THE PRESENT STATE OF PHARMACY IN GERMANY. By Robert Kane, M.D.

Read before the King and Queen's College of Physicians, in Ireland, November 18th, 1836.

Most of those whom I have the honour to address, are aware of the remarkable difference which is found to exist in the relation of the apothecary to the physician, according as we contemplate the condition of the medical profession in the British Islands, or on the Continent. On the one hand, we see him forced by circumstances, against which the will or exertions of an individual are utterly unavailing, into seeking for medical practice; an attempt in which he can be successful only by voluntarily conceding to his aristocratic rival the possession of the higher departments of professional qualification. And, on the other hand, he is observed leaving the treatment of disease to those who are educated by the State expressly to that object, preparing those medicines which are deemed by the physician advisable, and employing himself in examining the qualities, composition, and method of extracting drugs, for the purpose of improving their form, and facilitating their therapeutical application.

I do not mean to occupy the attention of this meeting with any discussion on the comparative merits of one or the other of these arrangements; such an investigation would here be out of place, and, I believe, could not lead to any useful result. The voice of society has determined that, in these

kingdoms, apothecaries shall practise medicine; and all that remains for the consideration of those who possess power, is to provide that they shall know how to practise well.

Notwithstanding that I avoid entering upon that question, it may not be uninteresting to the members of the profession, and even to those non-professional visiters who are present, that I should describe to them, briefly, the actual condition of the apothecaries in Germany, in order that the position which the members of that department of the profession occupy, as well in general, as in strictly learned society, may be clearly understood; for, unfortunately, the statistics of medicine and of its professors, have not attracted the attention the subject merits; and I have known many of my friends, as well physicians as apothecaries, express their opinion, that the apothecaries of France and Germany must be in a miserable state; for my friends, having in their mind the condition of such as are in this country, were naturally led to conclude, that an apothecary who did not visit, but should live by making up prescriptions, could have but a very insufficient income. In attempting, by the following remarks, to dissipate these incorrect ideas, I shall confine them to the state of Pharmacy in Germany, as in that country the pure apothecary exists in a degree of purity unknown elsewhere; the laws in France, as we shall cursorily remark, reducing the profession to a very inefficient condition. And it is fortunate for the simplicity, as well as for the brevity of the communication, that the differences between the regulations of the various German States are so trivial, that the description can be found almost equally applicable to all.

The grand distinction between the apothecary in Ireland and Germany, is, that the latter is, in fact, an officer of the government. On his being pronounced by competent examiners properly qualified for the office, he is, on the occurrence of a vacancy, appointed to dispense medicines to the sick people; and the government, in place of paying him a direct salary from the public purse, enables him to pay himself by charging for his medicines; the price being fixed by authority,

and competition being prevented, in as much as none but apothecaries are allowed to retail drugs, and the number of apothecaries is kept within a certain limit.

Let us consider each of these circumstances a little more in detail; and first, what is, perhaps, the most important, the education of the pharmaceutic student. About the age of fourteen or fifteen, the boy undergoes an examination before the pharmaceutic commission as to his acquaintance with languages, (Greek, Latin, French,) the elementary mathematics, and general instruction, as history, geography. If he appears so advanced, that his special education can be commenced, he obtains a certificate to that purpose, and enters as lehrling or apprentice into a shop, for a term of three or four years. To almost every shop is attached a laboratory; and we must recollect that, with a German apothecary, the student spends the years of his apprenticeship, not merely in making up recipes, as is the custom here, but is engaged in the nicest investigations of modern chemistry, and works under the same circumstances that brought into action the neatness and accuracy of Klaplork and of Rose; that developed the transcendent powers of discovery possessed by Liebig and by Scheele.

The student having completed the term for which he had engaged to the apothecary, his master, passes to the university, and commences attendance on the lectures of such professors as he considers best qualified to teach him what he wants. There is no curriculum made out; he knows the subjects on which he shall be examined; but he is left to acquire the knowledge requisite for passing, when, where, or how he chooses; it being understood that he cannot leave his own country's university without special permission. For two or three years he attends the lectures on mathematics, physics, chemistry, botany, pharmacology, zoology, mineralogy, sometimes also anatomy and physiology; and generally works a year in the university laboratory, particularly if the university professor be of eminence.

When the student has thus spent at least five years in the

acquisition of professional knowledge, he acquaints the pharmaceutic commissioner, that he wishes to be examined, and is accordingly examined for two several days, and for more than two hours each day. The examination is rigidly confined to the physical and natural sciences, but is in these exceedingly strict.

In chemistry, in botany, in the natural history of drugs, and in the mode of preparing and compounding them, a degree of accurate knowledge is required which might prove very inconvenient to demand from many of our most admired teachers. If the candidate be approved of, he receives his license to hold a shop; his business then is, to try whether he can get one.

While the student has been thus reading for his degree in pharmacy, he generally attends the lectures of the professors to the philosophical faculty, and becomes, on the termination of his studies, Doctor in Philosophy. The majority of the leading apothecaries, whose acquaintance I was so fortunate as to make, are Doctors in Philosophy. In fact, the apothecary is as usually Doctor in Philosophy, as the physician Doctor in Medicine; the doctorate of the medicinal faculty being only a nominal degree, and quite distinct from the license to practise medicine. It is on this account, that persons who are rejected here, or in England, obtain doctorship in Germany so easily; but if they applied for a license to practise medicine, or to act as an apothecary, the result would give them an idea of an examination completely new.

Our subject, who is now Apothecary and Doctor in Philosophy, wishes to get a shop and commence business. A shop can be obtained, however, only by one or two means, opening a new one, or purchasing one already established; both of these methods are restricted in a very remarkable manner. The government, having compelled the student to a course of education requiring so considerable an outlay of time and money, is bound to provide that he can obtain a compensating return; and this is effected in a manner very well worthy of imitation.

To each district is allowed a number of apothecaries proportional to its population; averaging, in the greater part of Germany, one apothecary to 5000 persons. The shops are, of course, principally in the towns, and this might give rise to false impressions. Thus, in Giessen, with only 8000 inhabitants, there are three apothecaries; but the surrounding country is very densely inhabited. Round Darmstadt the population is not thick, and therefore, though with 22,000 inhabitants, it has but five. Gottingen, with 10,000, has only two, the neighborhood being but thinly covered with people. There are, however, real exceptions to this average. Thus, I was informed by Professor Dulk, that in Prussia Proper, and in Pomerania, owing to the scattered nature of the population, there is but one apothecary to 8 or 10,000. And in the Rhine province of Prussia, the other extreme prevails, for there are not more than 2000 people to one apothecary, owing to the law having allowed, during the occupation of the French, an unlimited number of shops, and many of them remaining still in existence.

In general, however, there are 5000 people to one apothecary; and no person is allowed to deprive him of them; no retail druggists are permitted; none but an apothecary can sell medicinal drugs. The apothecaries, themselves, are not allowed to compete, at least by reduction of prices. Every year a price list for drugs is published by authority; and no apothecary is allowed to deviate from the prices contained in it, which are placed so as to give a very high rate of profit; indeed much higher than could be obtained here.

When a district, from improvements of manufactures, or otherwise, increases in population, a corresponding number of new apothecaries' shops are opened by the government; or what is the same thing, permission is given to so many of those candidate apothecaries whose names are first on the list, to open shops in such places as require them. This is the one way of getting into business. The other is, that the shops in the already peopled districts, from time to time, fall into the market, either from the death of their previous possessors,

or from their possessors becoming legally incapable of continuing longer to trade in medicine.

In the case of a vacancy by death, the heirs of the late possessor have power to sell the concern, but the purchaser must be one of those who have obtained a license to open shop. And where the shop becomes void by the dismissal of the former occupant, he is always allowed by the government, though not entitled, to dispose of his interest in it to the best advantage, the purchaser being, as before, one of the qualified class.

The income arising from a shop being thus always respectable, and sometimes very considerable, the number of candidates, who are often taken from the most respectable burgher families, together with the comparative rarity of a situation becoming vacant, raises the price of a good concern far beyond what, to our idea, would appear its value. Thus, in towns of from 6 to 8000 inhabitants, it is usual to pay from 6 to £800 for an establishment. In larger towns, 12 or £1400 is not uncommon; but in large cities, as Berlin, Dresden, Vienna, &c., the prices become enormously high. Indeed, I was assured by a gentleman of great eminence, and on whose veracity I can implicitly rely, that a short time ago, a shop,—certainly one of the first in Berlin,—was sold, and 60,000 thalers, equal to £9000, paid down; I must add, however, that the establishments which bring such high prices are not mere apothecaries' shops; there is generally attached to them a factory of chemical preparations. The leading apothecaries are generally manufacturers of the nicer chemical substances, particularly the vegetable alkaloids; and the names of Merck, Winkler, Wittstock, and many others, are nearly as well known in the commercial, as in the scientific world.

I mentioned that no apothecary is allowed to charge more for his drugs than the price regulated by the list; and as this price is quite sufficiently remunerating, he is forbid in the strongest manner from attempting to increase his profits by substituting an inferior article. There is in each state officers appointed, comprising the University Professors of Chemistry

and Botany, who yearly submit to strict investigation the condition of every apothecary's shop in the district. We know that there is in this country a similar examination, but it is a mere matter of form; the results are never known, at least, publicly; and the punishment is of too ridiculous a nature ever to be inflicted. In Germany, however, it is quite a different matter: each shop is separately the subject of a report, comprising the details of the size of the shop, states of drawers, glass cases, the number of rooms, the number of pupils, the nature of the library which the apothecary possesses, of the laboratory, the age, quantity, and condition of every single medicine. I cannot trespass so much upon your patience as to attempt the description of the items of such a report, but I am fortunately enabled to present the scaffolding of one, which will give a good idea of it. The labour of making out such reports for a district, is of course immense; and my friend, Professor Wackenroder, of Jena, has had printed, in a tabular form, all important heads, which, thus arranged, require only to be filled up. A copy of his programme, which he kindly presented to me, I submit to the examination of the meeting, having first written under the German heads the corresponding English words, as there may be some gentlemen to whom the vernacular may be more accommodating than that foreign language. It will be seen, that there is scarcely a conceivable subject in connexion with an apothecary's laboratory and shop, which does not enter into the list, and is allowed full room for comment.

Submitted to so rigid an inspection, it need not create surprise that a shop should frequently give occasion to an unfavourable report of its condition. In that case, the owner, if it be his first offence, is severely reprimanded. If he be a second time detected, a pecuniary fine is inflicted to a considerable amount, but varying in proportion to the importance of the shop, and the more or less grave nature of the offence. On his being a third time denounced, he is suspended, his license to hold a shop is removed, and the concern becomes legally confiscated to the state; but, in fact, he always obtains

permission, either to make over the management, or altogether to sell his place to a person qualified to act, and of whom there are always many waiting such an opportunity; he is himself irrevocably dismissed from his vocation.

Having thus described the details of the regulations to which the apothecary in Germany is subjected, the result is capable of being conveyed in a very few words. He becomes the fellow labourer, but not the rival, of the physician. His education is equal, though in a different path. His origin is as high; his income is as considerable; and he is received in general and in learned society on the same footing as any other man possessing equal property and information. If we look to any meeting of the German Association of scientific men, we find an independent section for pharmacy; and we likewise see that the great mass of the work of the chemical and botanical sections is accomplished by persons, who, if not apothecaries, were originally intended to be such, had not their talents and love of science carried them to a higher sphere of action.

Dublin Journal of Medical Science.

ART. LIII.—EXTRACT FROM A LETTER FROM MR. WILLIAM GREGORY TO M. ROBIQUET, UPON EBLINA.

Dr. Apjohn and myself have analyzed a substance discovered by Mr. Scanlan, of Dublin, in impure pyroligneous spirit. This substance is yellow; crystallizes in prisms; is volatile in a current of air, and decomposes by heat, in a tube closed at the end; it is insoluble in water and in the alkalies; soluble in alcohol, ether, and concentrated acetic acid. Concentrated sulphuric acid acts upon it, developing a deep blue indigo colour, but which disappears rapidly by the deposition of an enormous quantity of carbon. The same acid, diluted

with an equal part of water, produces, by the aid of moderate heat, a reddish purple solution with the new substance. But this solution, after remaining at least two or three days, is deprived of its colour, depositing brownish black flocculi. Concentrated muriatic acid dissolves it slowly, producing a reddish purple colour, so beautiful and intense, that it can only be compared to that of a solution of an oxymanganate. This colour also disappears with time, depositing carbon in a very minute state of division. Nitric acid dissolves it, rendering the crystals black. No hyponitrous acid is disengaged, except when a fuming, concentrated acid is employed, and then oxalic acid is the product, accompanied with a yellow substance, precipitated with water, which, when dried and heated, is decomposed with slight explosion—at the same time disengaging red vapours. Dry chlorine changes the crystals to a brownish resin, when aided by moderate heat. We have, as yet, been unable to produce any crystallized combination with the new body, so that the analysis of it has not been consonant with atomic weights. The mean of four analyses has given us C. 75.275, H. 5.609, O. 19.116, from which is obtained the following empirical formula, C^{21}, H^{18}, O^{4}.

Mr. Scanlan has given this substance the name of *eblana*, (Dublin,) which he prefers to that of *pyroxanthine*, which I have proposed. This body, which is to be ranged among the products, already numerous, of dry distillation, resembles more the naphtalase of M. Laurent, than any other, from which, however, it is very distinct, in consequence of its solubility in alcohol and ether, its reaction with muriatic acid, and finally, its composition. You are, perhaps, already aware that Mr. Scanlan has extracted from the same pyroligneous spirit, by simple rectification, a considerable quantity of aldehyd, which is also one of the products of the distillation of wood. Mr. Scanlan thinks that the largest part of the aldehyd passes off with the gas; and it appears to me very probable, that by causing this gas to pass through cold water, the aldehyd could be collected, which might then be easily changed into con-

centrated pure acetic acid. This is worth the trouble of trying.

By mixing the sulphovinates with the yellow and red ferrocyanurets of potassium, I have obtained new salts, upon the analysis of which I am now engaged. With the sulphovinate of potassa, I have obtained two salts, perfectly analogous to the corresponding ferrocyanurets, but which, besides the iron, the potassium, and the cyanogen, contain also ethule C^4, H^{10}. These salts, when heated, give off alliacious vapour, which is, I believe, either the hydrocyanic ether of M. Pelouze, C^4, H^{12}, Cy^2, or the cyanuret of ethule, C^4, H_{10}, Cy. Analogous results present themselves with the sulphomethylate of potassa. You will infinitely oblige me by presenting these notes to the Academy, or Society of Pharmacy. As soon as I have terminated the analysis of the last mentioned salts, I will send you the details.

Journal de Pharmacie.

REVIEW.

ART. LIV.—PHARMACOPŒIA OF THE ROYAL COLLEGE OF PHYSICIANS. London, 1836.

We may imagine the awe and admiration with which our fathers most probably regarded the first authorized codes of pharmaceutic lore; and as they studied the innumerable components of the Mythridate, what visions of powdered periwigs, long cues, three cocked hats, and gold headed canes, must have floated before their eyes. But now, when, "like angels' visits, few and far between," these comets spring forward to illuminate the medical horizon, we no longer are filled with alarm and dismay; every eye becomes armed with a philosophic tube, and particulars with respect to their disks, and tails, and perihelions, become subjects of the strictest scrutiny and criticism. There are many reasons why we should feel considerable interest in the publication of the New London Pharmacopœia. In this age of assimilation, no doubt the attempt will be made, before long, to make us Irish, swallow our medicine after the most approved London pattern; and it is most likely that this new edition of the London Pharmacopœia will be followed by a corresponding revisal of the Dublin. Now it becomes an important question, by how far the Dublin College can conscientiously agree with the results of London deliberation in promoting the assimilation referred to. We, therefore, open this book with more than ordinary anxiety, to ascertain whether it will serve as a model for a "Pharmacopœia Britannica;" but, previously to entering into an examination of its merits, let us inquire what are the objects which are desirable to fulfil in a Pharmacopœia; what are the principles upon which it should be founded. In our opinion, a Pharmacopœia should consist in an enumeration of the simples which should be kept in the laboratories of compounding chemists, together with a formulary for the preparation of all those compounds which are not usually found in com-

merce, and which are commonly prescribed by physicians. These we conceive to be the two great objects of a Pharmacopœia, which will be more or less perfect in the ratio of the completeness with which they are fulfilled. It is not as a means of advancing botanical or chemical science. It is not as an arena for the display of learning, in deciding difficult questions in natural history or medical literature. It is for the practical and useful purpose of requiring the employment of pure and constant medicines, in curing the diseases of his subjects, that his Majesty, William the IV., has sanctioned the present work. Now let us see whether the London College have justified the confidence of the king and council.

The preface tells us not to be in the least surprised at the Pharmacopœia of 1824 being now a little antiquated; that the College of Physicians had magnanimously determined to refurbish it, but found it a tough job—because "juste perpendere" was an act they were unaccustomed to. They were very desirous of obtaining the assistance of the Dublin and Edinburgh Colleges in framing a "Pharmacopœia Britannica;" but really, the distance was so considerable, that they were obliged to postpone this desirable consummation, until some further improvements are effected in the steam carriage. They are, according to their own account, very excellent chemists; and have added notes to the greater number of chemicals, by which the student or physician will be enabled to ascertain their purity. Having mentioned that there were some chemicals which they were willing to buy from manufacturers, they proceed to state—"licet ex his quædam nostro more præcipere maluimus, quam curæ ant incuriæ, aliorum permittere." Now, this we consider to be a very fair challenge; it is as much as to say—here we stand, with visors up, and lance in rest, ready for all comers; and we understand that one of their knight-errants has already broken a lance with a London reviewer; and yet, we—true Irishmen—are so heedless and headstrong as to be willing

> "To try conclusions with these Janissaries,
> And shew them what a pharmaceutic war is."

In fact, we do not hesitate to assert, that the chemical processes given in this Pharmacopœia are, in the first place, useless and uncalled for; in the second, neither calculated in many instances to obtain the cheapest or purest products. To prove our first position, it can easily be understood, that the persons engaged in chemical operations are either well-informed chemists, having recourse to the best authorities, and so independent of the Pharmacopœia; or ignorant persons without books, for whom the directions of the Pharmacopœia are quite insufficient. Let us take the preparation of nitrate of silver, as an example. You are desired to take

"An ounce and a half of silver; half an ounce of nitric acid; two ounces of distilled water. Mix the nitric acid with the water, and dissolve the silver in these in a sand bath; then increase the heat by degrees, and let the nitrate of silver be dried; liquify this in a crucible, by a gentle fire, till the water being expelled, the ebullition shall have ceased: then pour immediately into proper moulds."

Now all this, as far as it goes, is very correct; but no ignorant person could prepare a saleable article by such directions. Our friend, Mr. Ferguson, the late chemist at Apothecaries' Hall, could show the London College a great many omissions in their details. We have often seen the numerous precautions taken by this gentleman, and he has kindly permitted us to tell them. The pure silver of the jewellers is the kind he employs. It contains gold and some copper: by dissolving in dilute nitric acid, perfectly free from chlorine, the gold is thrown down as a blackish powder. It is better always to crystallize the nitrate of silver; and if it be necessary to filter the solution, let it be through pounded glass, for the slightest contact of organic matter will blacken the salt. The crystals should be placed in a glass funnel and washed with a stream of distilled water, which will carry all the nitrate of copper to the bottom of the funnel, so that if you reject a drachm or two of the salt in the neck, you will separate all the copper. The crystals must be then completely dried, and melted in a platinum crucible; if melted cautiously, there is no necessity for

the addition of nitric acid or fresh crystals, as recommended by some, such addition being liable to render the product of an Isabella yellow; then let it be poured into a warm silver mould. When nitrate of silver is prepared in this manner, it is perfectly white, and does not, as the Pharmacopœia misinforms us, become blackened in the sunshine. The test given for its purity in the Pharmacopœia is perfectly fallacious; for when chloride of silver is thrown down from a concentrated solution by an excess of chloride of sodium, some of the precipitate is always re-dissolved, and the supernatant liquid will consequently become discoloured by sulphuretted hydrogen. But nitrate of silver is not a solitary instance of the insufficiency of this book, for enabling an inexperienced person to prepare a chemical. No one, not previously conversant with chemical manipulation, could prepare sulphuric ether by the formula here presented. Even the directions for rectifying it are utterly insufficient, no clue being given to the proper temperature. The varieties of apparatus necessary for the different preparations, are passed over in the most dignified silence.

We now proceed to prove our second proposition—that the chemical processes are not calculated to yield either the cheapest or the purest products. In some instances, the process, not recommended, but commanded to be pursued, is not at all adapted for obtaining the intended product. Protoxide of mercury is desired to be prepared by agitating together a gallon of lime water with an ounce of calomel. We prepared some in the above manner, and when heat was applied to a portion, were edified with the spectacle of five-sixths subliming in the form of a protochloride of mercury; yet we are gravely told in the notes, that we may ascertain its purity by its not dissolving in muriatic acid—(how could it?)—by its completely subliming—(no doubt; but what are its products?)—and by its dissolving in acetic acid. We question whether the College applied this last test.

In other instances, preparations are directed which have not the slightest use in medical practice. Acetic acid is, for

the most part, used as a powerful corrosive; the Pharmacopœial acid is of such a strength as to be fit for little or nothing. Can any person, who ever practised pharmacy, read the directions without a smile? Take two pounds of acetate of soda, nine ounces of sulphuric acid, nine fluid ounces of water. The best way of making it, is by decomposing acetate of lead with strong sulphuric acid, (1.845,) and agitating the distilled liquid with peroxide of lead. Sometimes the process recommended is excessively wasteful. The trisnitrate of bismuth is directed to be prepared by pouring a solution of nitrate of bismuth into distilled water, and washing and drying the sediment. A great quantity of bismuth will be lost by this process, and the subnitrate obtained will be discoloured. Every manufacturer knows that the careful addition of water of ammonia to the supernatant liquid, as long as it remains acid, will obtain a much greater quantity, and that the water being acidulated with a little nitric acid, previous to the addition of the salt, will greatly improve its appearance. In Dublin we obtain it from the druggists in the form of beautiful capillary crystals.

We have instances where new preparations are substituted for old ones, with the most reckless indifference to the opinions of the profession. The old tartar of iron was a great favourite with many practitioners; it was made, as our readers are aware, by exposing iron wire, mixed with cream of tartar, to the united action of water and atmospheric air; the iron, influenced by induction from the potassium, only acquired a protostate of oxydation; and there was thus obtained a permanent protosalt, by many considered a desideratum in Materia Medica. But the College have substituted for this preparation a salt, formed by the direct combination of peroxide of iron and bitartrate of potash, which may, or may not, be a preferable compound; but they might, at least, have afforded to the profession the privilege of a choice. The whole preparation is worthy of notice, as a precious example of pharmaceutic legislation. To obtain the hydrated peroxide, you are to dissolve what is commonly called the precipitated

carbonate of iron (itself a hydrated peroxide) in muriatic acid, and throw it down again by liquor potassæ. Our readers may recollect the rhyme:

> "The king of France, with twenty thousand men,
> Sailed up the Scheldt—and then sailed down again."

Lastly, there are several preparations which are objectionable in every point of view. Tartar emetic is made by boiling cream of tartar with crocus of antimony. Hear what Berzelius says of this method: "L'ancienne pharmacopée suèdoise prescrit de faire bouillir, pendant une heure, du crocus avec de la crême de tartre, de filtrer la dissolution et de l'evaporer jusquá siccite, mais on obtient par ce moyen un produit dont la composition varie, et qui renferme quelquefois de la crême de tartre non saturée."

Iodide of potassium is made by decomposing the iodide of iron by carbonate of potash. This is Baup's process; which is objectionable from the difficulty of avoiding an excess of potash on the one hand, or of suffering a considerable loss on the other, from the precipitation of peroxide of iron carrying down a large quantity of iodine. Mr. Ferguson has mentioned to us a process which he has been in the habit of pursuing, which is simple, cheap, and most extraordinary: by boiling carbonate of potash, iodine, and iron turnings together, with a proper quantity of water, iodide of potassium is formed; carbonic acid and oxygen escaping with a violent effervescence, and the iron turnings remaining untouched. This is most strange, and evidently belongs to the operations of catalysis, lately generalized by Berzelius. We are told in the notes, (a fact with which chemists were hitherto unacquainted,) that iodide of potassium loses none of its weight by being subjected to the fire. Chloride of barium is directed in the Pharmacopœia to be prepared by decomposing carbonate of baryta with muriatic acid; every one knows how much more rare a mineral witherite is than heavy spar.

Sulphate of potash, the College order to be made by roasting the supersalt remaining after the preparation of nitric acid,

until the excess of acid is expelled. This is a most awkward method; besides, that this residual salt is much sought after in the arts. A much preferable method, is the direct addition of strong sulphuric acid to a concentrated solution of carbonate of potash. The acid will require to be added cautiously in a large vessel, on account of the violent effervescence; but the sulphate is thrown down in the form of minute, easily-powdered crystals, which, by those who are acquainted with the difficulty of pulverizing this salt, will be esteemed an advantage.

Iodide of mercury is directed to be prepared by rubbing together an ounce of mercury with five drachms of iodine; a little alcohol being added during the trituration. We prepared some in this way, and mixing it with a solution of chloride of sodium, allowed it to filter; upon the addition of nitrate of silver, a copious precipitate was thrown down, which only partially dissolved in water of ammonia. The iodide of mercury evidently contained a large quantity of biniodide.

It is quite unnecessary to multiply instances. We think we have sufficiently proved both our propositions; and that it will be generally allowed that the chemical processes of the Pharmacopœia are insufficient, and incapable of producing pure or cheap articles. Is it not a gross perversion of power, thus to dictate to manufacturers the method and the materials they are to use, in preparing things about which they must necessarily know most. The College have placed themselves in this predicament: either to oblige compounders to use no chemicals, except those that are made "nostro more," and so inflict a grievous hardship; or to connive at the use of compounds prepared very differently from their commands, and so dishonour the king's warrant. Leaving the College to wriggle, as well as they can, from between the horns of this dilemma, we proceed to examine the remainder of their preface.

The next subject of importance referred to, is the change of names, which, they assert, is one of considerable difficulty; but it appears that they have made up their minds, for they

say, "quoniam nobis persuasum est rei cujusque nomen id demum certissimum et stabillisimum fore, quod artis suæ principes imposuerint." Now, like Dr. Franklin, when we get a good principle we like to go through with it; "the name is the most certain and permanent which is imposed by the principles of the art itself." Very well. So we have "cupri ammonio-sulphas:" "ferri ammonio-chloridum:" "ferri potassio-tartras:" "ferri sesquioxydum:" "hydrargyri ammonio-chloridum." But why call yellow prussiate of potash "potassii ferro cyanidum?" It should be, according to their own rule, ferri potassio cyanidum. And again, do the principles of the science impose names inconsistent with chemical composition? Is there any reason to believe the "ferri ammonio-chloridum" to be a chemical compound? One atom of acid to fifty of base, would be a new fact in chemical combination. An oxide of iron containing twelve or fifteen per cent. of protocarbonate, has not been hitherto considered a very pure sample of sesquioxide. Sal alembroth cannot certainly be the compound intended by the "hydrargyri ammonio-chloridum," and yet we know of no other deserving of the name. Mr. Hennell considered white precipitate to be a compound of peroxide of mercury and sal ammoniac. And our friend, Dr. Kane, supposes it to be a combination of bichloride of mercury with amiduret of mercury; but neither view will license the pharmacopœial title. Again, prussian blue is not a percyanide of iron, but a mixture of both cyanides. But, really, it is too absurd, in the present state of chemical nomenclature, to put the profession to the trouble of altering the names of almost every medicine. Scarcely two writers on chemistry are agreed with respect to nomenclature; what one calls "sesquioxide of iron," another calls "ferric oxide;" what one names "hydrargyri ammonio-chloridum," another styles "chloro hydrargyrate of ammonium;" and others, "the double chloride of mercury and ammonium." Very little doubt remains on the minds of many chemists, that the compounds, hitherto called "hydracids," are actually bases, like the haloid salts of iron or zinc.

The very term, "salt," as it is now used, is most objectionable; conveying an idea, in chemistry, utterly at variance with its ordinary acceptation. The present system of chemical nomenclature is most unlikely to be permanent, different principles being acted on in naming perfectly analogous groups of amphide salts. Is the science of medicine to be perpetually agitated by every wind of nomenclature, confusion and danger to human life being the necessary consequence of every sudden change?

Leaving the preface, we now turn to the body of the work itself. And here we are startled by the alteration of the liquid measure, from the wine to the imperial gallon, and shocked by the excessively careless manner in which the alteration is effected; no comparison, whatever, is instituted between the new and the old measures; no notice is taken of the fact, that the new ounce is about eighteen grains lighter than the old; or that the new pint is 1460,5 grains heavier than the old. The number of grains of distilled water contained in the imperial gallon, is not even hinted at; and there is not the slightest allusion to the change of measures throughout the body of the work. Now, when it is recollected the class of persons for whose use the Pharmacopœia is principally intended, and the dreadful consequences liable to ensue from mistake, this negligence must be considered as most culpable. How can the members of the College expect apothecaries' apprentices and druggists' assistants to be less liable to error than themselves. When we find a council of sage medical gentlemen, "with spectacles on nose, and brows of monstrous size," writing "decem," instead of *duas*, (*vide* Errata;) "uncias duas," instead of *drachmas duas* (*vide* Tinctura Ammoniæ Composita;) "tribus," instead of *duabus*, (*vide* Ammoniæ Liquor, F.;) and prescribing the materials for preparing prussic acid of the strength of two grains in the "ounce," instead of "100 grains," surely we need not be astonished, if a stupid boy should make arsenical solution with eighty grains to the wine pint, in place of the imperial.

In turning over the pages of the Materia Medica, we con-

fess ourselves completely dazzled by the display of scientific learning exhibited. Galls are "gemmæ morbidæ;" it is the cormus of the colchicum; the "rhizoma" of the ginger; the "fructus" of the umbelliferous plants, which are ordered to be employed. Unfortunately, botanists are not agreed about the term "cormus." Wildenow and Decandolle define it to be "partie des vegetaux cryptogames qui se trouve hors de terre; la fructification exceptée." We are not inclined to quarrel about trifles, but surely it is right to be consistent; if we speak of "carraway fruits," and not carraway seeds, we should not talk about the "simple flowers" of the chamomile; the bark of the fruits of the orange; the pulp of the legumes of the "cassia;" or more correctly, the "catharto-carpus fistula," whose fruit is not a legume, but a lomentum. The "dried pulp of colocynth:"—"pulp" is applied to cellular tissue contained within the cells of the carpels; the part of the colocynth used, is the sarcocarp, or flesh. The "stigmas of saffron:"—stigma is the denuded extremity of the style; it is the styles that are employed. Here, again, we have some desirable information afforded us. We were not before aware that musk was "humor in folliculi præputii secretus;" and we we were much edified by the Hispanio-Latin coinage, "Vinum Xericum." But we are sick of this petit maitre kind of science. "In our souls we loathe all affectation;" and when men are called on to perform a grave and important duty, the exhibition of pseudo-scientific frippery is most uncalled for. Forsooth, red bark is the produce of the "cinchona oblongi folia;" aloes, of the "aloe spicata;" rhubarb, of the "rheum palmatum;" copaibi, of the "copaifera langsdorfii."

"Si j'ouvre l'historie de la matière mèdicale," writes a very great authority, "j'observe qu'un grand nombre de medicamens, meme les plus actifs, qui, dans l'enfance de la science avaient été regardes comme les produits d'une seule plante, se sont trouvés, lorsque leur histoire a été mieux suivie, appartenir a plusieurs espèces, voisines-ainsi le quinquina est tirè de toutes les espèces de vrais Cinchona, la rhubarbe de presque tous les Rheum, l'opium de plusieurs Pavots, le semen-

contra de plusieurs Absynthes, la terebinthine de la plupart des Pins, ainsi l'histoire mieux connue de la gomme adragant nous montre qu'on la tire de plusieurs astragales èpineux: il en est de meme de la gomme arabique qui de-coule de plusieurs Acacias." In fact, what had the framers of the Pharmacopœia to do with these disputed points? That which they should have done, they have left undone; *i. e.*, to furnish a complete list of drugs, with a description of the varieties which are proper to be kept in apothecaries' shops; thus, they mention aloes, sarsaparilla, opium, &c., without affording any clue to the kind which ought to be preferred, although it is notorious, that the varieties met with in commerce differ in a most remarkable degree. We have at present two specimens of sarsaparilla root before us, the one with a light brownish cuticle, rather thick, with a considerable layer of amylaceous substance between the epidermis and the woody centre. The other, with a cuticle of a much darker brown, a very thin, reddish layer placed between it and the central wood. The first produces an infusion similar to turbid beer; the latter, when infused, gives the water the clear, deep red of the best brown stout. Now which of them are we to employ? The College gives us no directions. The best Turkey opium usually yields twenty pounds of extract from twenty-eight pounds used. We have known dry Egyptian opium to give more than its own weight; but it is quite a matter of indifference to the College of Physicians.

We find scammony, sometimes, as light and porous as a pummice stone; at others, dense, heavy, and dark coloured. The one is as good as the other, in the estimation of the Pharmacopœia. Here are two varieties of senna leaf; the one requires much more to be employed, in making an equally dark coloured decoction, than the other; whilst its smell is most nauseous and unpleasant, that of the other being aromatic and agreeable. We are left quite in the dark which of them to prefer. Now, when it is recollected that this is the very purpose for which a Pharmacopœia is intended, this negligence is most reprehensible. We hope to see, in future Pharma-

copœias, a complete description of the drugs ordered; such as will enable the best to be easily recognised, together with the means, as far as is known, of testing their purity, and of removing adulterations. These are the legitimate objects of a Pharmacopœia.

With respect to the pharmaceutical preparations, this book is miserably deficient. One of the few sensible alterations which we have observed, is, directing the aromatic waters to be prepared by rubbing the oil together with carbonate of magnesia and the proper quantity of water, and then filtering. But even here we have the usual exhibition of negligence. Do they mean, that as much oil of roses should be employed, as oil of cinnamon? Hemlock poultice is desired to be prepared by mixing together two ounces of extract of hemlock, a pint of water, and a sufficient quantity of linseed meal. What an expensive and awkward process! Yeast poultice is to be made with a pound of flower and half a pint of barm. We refer them to Mr. Donavan's paper, in the Annals of Pharmacy, for the year 1830, to show them the absurdity of this preparation. "Ceratum sabinæ" is useless, according to their method of preparing it. How much of the essential oil do they imagine will be extracted by immersing savine leaves in melted lard, and then expressing? The Dublin College go to the other extreme, in a similar preparation; directing you to fry the leaves in lard, and, consequently, driving off all the essential oil. The best way of preparing it is, to rub a determinate quantity of essential oil with simple ointment. "Ceratum saponis" still continues with all its imperfections on its head. By boiling soap together with a solution of acetate of lead, some very excellent lytharge plaster is formed, which floats in a solution of acetate of soda; by boiling down the liquid to the consistence of a paste previous to the addition of the soap, this might be avoided. We refer them to Mr. Ferguson's paper, in the first volume of the Dublin Journal. There is an air of mock dignity about the directions of all pharmacopœias, which affords us much amusement, but which is connected with this inconvenience, that great difficulty is

felt in getting down from the stilts, to afford the necessary minute directions: thus, you are desired to powder saffron, tragacanth, myrrh, hippo, scammony, colocynth, &c., although left without any direction in what manner to proceed; and when advice is vouchsafed with respect to the method of compounding, it is, in many instances, impracticable to be obeyed: thus, in the confection of rue, you are desired to powder gum sagapenum, a process of some difficulty, it must be confessed. Why have they so wantonly altered the proportions of tobacco enema, from one drachm in sixteen ounces, to a drachm in twenty; and in the infusion of digitalis, from a drachm in eight ounces, to a drachm in twenty ounces. No directions are given about the temperature at which turpentine enema should be made, so the compounder is perfectly at liberty to coagulate all the albumen of the egg, if he wishes. The old process for inspissated juices is preserved, without any regard to the late discoveries or improvements. Compound infusion of senna still retains its place, although it must be well known to the members of the College, that it is always prepared by decoction. How ridiculous, also, to direct the compound infusion of roses to be infused during six hours. These are preparations usually wanted for immediate use, and are not injured by a short decoction; on the contrary, much more of the active principle of senna is extracted by boiling, than by macerating. We have been amused by the manner, throughout the whole work, in which the specific name of the plant is substituted for the name of the drug; thus, in "confectio piperis nigri:"

℞. Piperis Nigri,
Inulæ, singulorum Libram,
Fœniculi Libras tres,
Mellis,
Sacchari, singulorum Libras duas.

Can this be considered as a substitute for the old system of transubstantiation in the defunct Pharmacopœia, where a

whole section was headed "Vina," although not containing a drop of wine in any of the preparations it contained. In the teeth of the temperance societies, the College have, however, restored real wine to the present edition. And to show, moreover, the determined "spirit" in which they are resolved to resist new-fangled innovations, they have introduced a formula for the preparation of "Mistura Spiritus Vini Gallici;" Anglice, egg-flip. We assure you, reader, it is no joke; here it is, page 143. "Take brandy and cinnamon water, of each four fluid ounces; the yolks of two eggs; half an ounce of purified sugar; two minims of oil of cinnamon.—Mix." We have it in contemplation to make some experiments on this preparation, during our leisure hours.

The directions for making simple syrup are, ten pounds of sugar to three pints of water; this is by far too much. Liniment of verdigris is still retained in its old form, although it is notorious, that when made some time it does not contain one particle of copper; it should always be pre-prepared extemporaneously, by rubbing up the distilled verdigris of commerce with honey. The change of names is sometimes most absurd in this department: think of calling mucilage of gum, "mistura accaciæ;" this same mistura acaciæ is used for making several pill masses:—the very worst thing they could have chosen. But we leave the catalogue of errors, first recording our hope that the "Pharmacopœia Collegii Regalis Medicorum Londinensis" may never become the "Pharmacopœia Britannica."

JOHN ALDRIDGE.
Dublin Journal of Medical Science.

ART. LV.—FACTS TO SERVE AS A CHEMICAL HISTORY OF GENTIAN ROOT. By M. CLAUDE LECONTE, Paris.

GENTIAN, *(Gentiana lutea, L.)* called also yellow gentian, and great gentian, belongs to the dicotyledonous, monopetalous, hypogynous plants of Jussieu, to the vascular, exogynous corolliflowered, plants of Decandolle, and to the class Pentandria, order Digynia, of Linnæus. According to Dioscorides and Pliny, the name of this plant is derived from that of Gentis, or Gentius, King of Illyria, who appears to have recommended its root for certain epidemic diseases.

This root being one of the most noted remedies of our indigenous matèria medica, at an early period attracted the attention of chemists; yet, it must be said, the data which science has bestowed, as to the nature of its constituent principles, are far from being complete.

In the year 1819, when MM. Pelletier & Caventou made their fortunate investigation of the barks, and discovered quinia, which has since been of so much consequence in therapeutics, M. Henry endeavoured to isolate the active bitter principle of gentian. This skilful operator, having exhausted the power of solvents upon this root, successively separated from it, by ether, an oily substance, possessing odour and bitterness, united with another glutinous substance less bitter, which he compares to glue; by alcohol, a very bitter extractive substance, soluble in water, which he has considered as containing the sole active principle; by water, an insipid mucoso-gummy matter.* About the same time, MM. Guillemin & Foecquemin addressed to the Journal de Pharmacie, a paper upon the same subject. It results from their

* M. Fee, in his Cours d'Histoire Naturelle Pharmaceutique, in addition to the principles stated by M. Henry, enumerates silica, alumina, magnesia, and iron, in accordance with the researches of MM. Guillemin & Foecquemin. M. Henry has not given, as asserted by M. Fee, the name of gentianin to his bitter extract, this product not being the same as the gentianin of MM. Henry & Caventou.

researches, that gentian contains a soft, fatty matter, having some resemblance to wax, sugar, gum, and a resinous substance of insupportable bitterness, which they regard as the active principle, mixed with substances from which they could not separate it.

Among the inorganic products, they have pointed out the presence of lime, alumina, silica, magnesia, and iron, united with carbonic, muriatic, and sulphuric acids. The following year, MM. Henry & Caventou resumed their labours upon gentian, and published a memoir, in which they announced, that they had isolated the active principle, to which they gave the name of gentianin. They there state, moreover, the presence of the following substances: glue, a fixed oil, an undetermined acid, an odoriferous principle not isolated, uncrystallizable sugar, gum, a yellow colouring matter, and lignin. It should be added that, in 1814, M. Planche had made known a volatile principle, capable of producing nausea, and a species of intoxication.

Finally, very recently, M. Denis has demonstrated in gentian the presence of pectic acid, which undoubtedly is the mucoso-gummy matter, in the first instance spoken of by M. Henry.

The memoir of MM. Henry & Caventou, and the therapeutic experiments made with gentianin appear so precise, that the conclusions of these chemists had to be admitted, and all that has since been written, in works upon Chemistry, Materia Medica, and Pharmacy, has been drawn from this memoir. I certainly should not have conceived the idea of making researches upon a subject, which has passed through the hands of masters so distinguished, if having been élève interne of the Pharmacie contrale, I had not been charged by M. Soubeiran with the preparation of gentianin, according to the received method. In the first instance, I encountered some difficulties, and at length succeeded in obtaining this product, but with less ease than had been stated by the authors of the discovery; and I was very much astonished, when, upon wishing to purify and deprive it of its yellow colouring matter, had this been prac-

ticable, that I obtained it, after several crystallizations, completely deprived of its bitter taste. It is this circumstance which induced me to undertake some experiments upon gentian, in order to discover the nature of the bitter principle; the substance which had been regarded as such, not being the yellow crystallizable matter, which does not possess any bitterness.

In the course of my experiments, I have been enabled to observe, that when submitting gentian to the action of solvents, it is important to take into account the differences of purity, of concentration, and of temperature. I shall endeavour to show this, by noticing the principle ones—ether, alcohol, and water.

Ether, deprived of alcohol, and perfectly dry, brought in contact with gentian, pulverized, and deprived also of its hygrometric water, affords a liquid, little coloured, which, by evaporation, leaves a product possessed of very little bitterness. If, on the contrary, ordinary ether is employed, which is always mixed with a little water and alcohol, and gentian charged with the humidity of the atmosphere, the liquid is more coloured, and affords as a residue a very bitter substance. By operating with dry ether and dry gentian, I have always obtained, as the product of evaporation, a soft substance excessively sticky, without the appearance of crystals, and composed of glue, oil, and gentianin. By employing humid materials, I have constantly had mixed with the first product, a brown substance, excessively bitter, acid, soluble in alcohol, and partially in water, appearing to be formed of a sort of extracto-resinous matter, an acid strongly reddening litmus, and a very bitter deliquescent substance.

By treating gentian with boiling alcohol at 40°, a liquid little coloured is obtained, which, upon evaporation, affords an excessively bitter extract, composed of a fixed oil, a yellow crystallizable substance, resin, sugar, free acid, and bitter extract. If the alcohol is employed cold, the extract is less coloured, and affords small yellow crystals, formed in the glutinous mass. It also contains less resin.

Alcohol at 35°, whether hot or cold, furnishes an extract

which has a very great resemblance to that obtained by alcohol at 40°.

Alcohol at 30° dissolves very nearly the same principles, but the extract is then much charged with resin, which is with difficulty separated from the yellow crystals, and which renders their extraction very difficult.

All these alcoholic extracts, taken up by water, give nearly the same products. Water removes the bitter extract, the sugar and acid, and leaves the fixed oil under the form of white flocculi, and the yellow crystals united with a little resin. It is easy to isolate these last products, by treating them with boiling alcohol at 30°, which dissolves the gentianin, the resin, and a very small quantity of oil, which can finally be removed by a little cold ether. Cold alcohol at 40°, however, affords crystals less charged with resin, and more easily purified.

Water, by the first maceration, removes from gentian all its colour, and a great part of its bitterness. It dissolves, in a great measure, the pectin which gelatinises at the end of a certain time. Having acted, by means of ether and alcohol, upon gentian exhausted by water, I was not able to obtain gentianin from it, which led me to think that it is removed by the water, in despite of its little solubility in this vehicle, and doubtless favoured by the other principles contained in the root, which facilitated solution.

Water, holding an alkali in solution, removed still more promptly the colour and bitterness of gentian. When acidulated, nothing of consequence resulted.

Gentian, exhausted by alcohol, is completely deprived of its bitter portion. There is nothing, except ether, when it is very pure, which is not charged with it; or, to speak more rigidly, does not take up traces of it.

Of Gentianin.

The name gentianin, given by MM. Henry & Caventou to the yellow crystallizable substance, conveys the idea that this substance is the cause of bitterness in gentian, and the principle of its action upon the animal economy.

I have already shown that this gentianin can be deprived, by successive crystallizations, of all the bitter principle which it contains in the state of mixture; but as the word gentianin has been for a long time employed to indicate the bitter principle of gentian, I have judged it proper not to employ it to designate a substance entirely destitute of bitterness; although it be true to state, that it composes in a measure the gentianin of MM. Henry & Caventou. I propose, in consequence, the name of gentisin, which sufficiently recalls its origin, and which I derive from Gentis, King of Illyria, to whose memory the genus Gentiana has been consecrated.

To procure their gentianin, MM. Henry & Caventou have employed ether, strong alcohol, weak alcohol, then water and magnesia, and finally ether; they have even retaken the magnesian precipitate by oxalic acid. It is true, that ether, although imperfectly dissolving gentisin, removes from gentian all its yellow crystalline matter; but it is necessary to employ a considerable amount of ether to obtain a small quantity of product, and the substance is connected with glue, which requires several alcoholic solutions to be separated.

This method is, therefore, long, difficult, and expensive. From among the solvents of gentisin, I have endeavoured to find one which would yield me a pure product by a method more prompt and more economical. Alcohol at 40°, at 35°, at 30°, and water with an alkali in solution, were successively employed, as well hot as cold; it is cold alcohol at 40°, which has afforded me most advantages.

To prepare gentisin, I take coarsely powdered and dried gentian. I treat it by successive macerations in alcohol at 40°, until it no longer becomes coloured. The liquids, being united and filtered, are submitted to distillation; the extract obtained is treated by water, which dissolves the bitter extractive matter, the free acid, the sugar, and leaves under the form of white flocculi, the fatty matter in union with the gentisin. This precipitate is collected, washed, dried, and redissolved in boiling alcohol at 30°, which dissolves the yellow

crystalline substance, and hardly acts upon the fatty substance. If the gentisin, when crystallized by cooling and spontaneous evaporation, still contains a little oil, which may have been retained from the ebullition, it can be removed by a little ether. If it be re-dissolved in boiling alcohol at 30°, it is obtained under the form of perfectly pure and beautiful yellow crystals.

Whatever method I might employ, I have never obtained more than one part in a thousand, as the product.

Gentisin is of a pale yellow colour, crystallizes well in long needles, is extremely light, has a feeble, peculiar odour, and no taste; it possesses no action upon the economy; several grammes may be taken with impunity. When exposed to the air, gentisin undergoes no alteration; heated to 100 R. in a salt water bath, it does not lose weight, and undergoes no change.* Placed in a tube plunged in oil heated to 250°,† it is not decomposed. At a temperature approximating 300°, it assumes a light brownish tint, but still is not volatilized. But by heating it by means of a spirit lamp, this substance gives off some yellow fumes, which are condensed in the cold portion of the vessel. By continuing to heat it, it becomes more and more deeply coloured; is diminished in bulk and enters into fusion, assuming the appearance of a fatty substance. If the heat be not pushed too far, the gentisin, in part decomposed, and having the appearance mentioned, becomes concrete upon cooling. It then takes the appearance of a brown mass, with a crystalline structure; if a small porcelain

* It is stated, in the number for July of the Repertoire de Chemie et de Physique, p. 110, in a note by M. Trommsdorff upon gentianin, that "heated in a glass tube to the temperature of boiling water, a small quantity is decomposed, and the remainder sublimes under the form of yellow needles." This is, doubtless, by mistake, as MM. Henry & Caventou did not announce it in their memoir, and as gentianin is far from being decomposed at this temperature.

† M. Fee, in his Cours d'Histoire Naturelle Pharmaceutique, also tells us that gentianin is decomposed at 135°, and yields as a product an azoted matter. This, moreover, is not mentioned in the memoir of MM. Henry & Caventou.

capsule be employed, and this be inclined to expose the structure, it will be found to have crystallized in small needles.

Gentisin is very little soluble in water at the ordinary temperature, the proportion is 0.020 to 100; boiling water dissolves but 0.026. If a small quantity of sulphuric, nitric, or muriatic acids be added to the water, the solvent power is not augmented; if, on the contrary, a small quantity of alkali be added, (potassa, soda, or ammonia,) the liquid immediately assumes a beautiful yellow colour, and the crystals are completely dissolved, and in large quantity.

110 of alcohol at 30°, dissolves 0.20 of gentisin at the ordinary temperature; upon carrying it to ebullition, it dissolves 1.12, and allows it to deposit in beautiful yellow crystals upon cooling. Alcohol at 40°, dissolves 1.60 when in a state of ebullition, and only 0.22 at the ordinary temperature.

Ether, which hitherto has been regarded as its best solvent, does not take up at the ordinary temperature, but 0.050 to the 100, when it is pure.

The alkalies dissolve it without alteration, and form with it crystallizable compounds, which I have been inclined to consider as true salts. But they are decomposed easily; and not having been enabled to study more than a single one, I have hesitated to give to gentisin the name of gentisic acid, which perhaps would be more appropriate. Like many colouring substances, it appears truly to play the part of an acid as regards bases.

I shall, nevertheless, present some of the characters of very beautiful yellow crystals, which I obtained by combining gentisin with soda. By adding some drops of caustic soda to distilled water holding in suspension crystals of gentisin, they were promptly dissolved, and gave to the water a beautiful yellow colour. By evaporating the liquid almost entirely, a crystalline mass was obtained, which, treated with boiling alcohol at 30°, was partially re-dissolved; and, upon cooling, was deposited under the form of beautiful long crystals of a golden colour. These crystals, collected and dried by expo-

sure to the atmosphere, presented the following characters. Heated to 100°, they lost 23 to 100 of their weight, and assumed a reddish tint; by continuing to heat them in a glass tube to 250°, they became brown, without undergoing decomposition. At a more elevated temperature, exposed to the air, the substance was blackened, inflamed, and left as a residue a white ash retaining the form of the crystals. If heated to redness, the residuum entered into fusion, and left, upon cooling, a hard mass, which, with re-agents, exhibited the characters of carbonate of soda.

110 parts of boiling alcohol at 30°, dissolved 10.3 of gentisate of soda, and when cold, 7.0. This vehicle allows crystals of gentisin to be deposited, and retains the soda. The solution of gentisate of soda is of a beautiful yellow colour. If a current of carbonic acid gas is made to pass through it, the liquid is deprived of its colour, and deposits gentisin of a white colour, which, however, resumes the yellow tint when desiccated.

Upon burning gentisate of soda in a platina crucible, and adding sulphuric acid, I obtained sulphate of soda, the weight of which indicated the quantity of soda. It results from this experiment, which has always given the same weight when repeated, that the gentisate of soda is formed of 6.81 soda, and 93.19 gentisin.

The action of concentrated acids upon gentisin affords nothing remarkable. With sulphuric acid the colour is deepened, is suspended, and disappears in part; heated, it becomes red, then black, and if it is evaporated, nothing but carbon remains. There is no action when the acid is diluted. Concentrated nitric acid exhibits no action at the ordinary temperature; if heated, the substance becomes coloured greenish yellow; and if carried to evaporation, it becomes black, and leaves carbon as a residuum.

I should state here, that recently, and about the time that I announced that the crystalline substance of the gentian is not the bitter principle, results analogous to those obtained by me were published by M. Trommsdorff. He, however, asserts

that gentianin sublimes without residue at a moderate heat. I have always witnessed the contrary—that it could not be made to sublime without decomposing a large portion. He also announces that this substance decomposes alkaline carbonates. I, on the contrary, have seen carbonic acid decompose the gentisates and separate the acid in a pulverulent form. If an excess of gentisin is boiled in a solution of very pure carbonate of potassa, and the gaseous product passed through lime water, carbonate of lime is not formed, and the gentisin preserves its pale colour, which is a proof that it has not entered into combination with the potassa.

Glue of Gentian.

This differs from ordinary glue, in its colour, fusibility, odour, and composition. The glue of gentian has a soft consistence, is very tenacious, has a yellow, sometimes a greenish, colour; its smell is feeble, and is analogous to that of gentian; it has no taste; when heated, it softens at 40°, and melts at 50°. It is insoluble in water, and in alcohol at 30°. It dissolves well in the oils, essence of turpentine, and ether. If treated with boiling alcohol, at 40°, it is partly dissolved, letting fall, upon cooling, a white, fatty, sticky substance, which appears to be formed of a waxlike substance and a green oil. The solution retains only the green oil. By treating several times, with alcohol at 40°, the glue which had not been dissolved by the first treatment, the alcohol becomes charged with new quantities of oil and wax. If the residuum be acted upon by absolute alcohol, a large proportion of this product is still removed, which is precipitated by cooling. This deposit is white, pulverulent, no longer adheres to the fingers, and appears to be almost pure wax. Finally, the substance which cannot be dissolved in alcohol, is dissolved in pure ether, which, when evaporated, leaves a brown, elastic product, non-adherent to the fingers, lighter than water, entering into fusion at 120°, burning in the flame of a candle, and diffusing the smell of caoutchouc. The cereous substance appears to possess considerable resemblance to ordinary wax. Heated, it

melts at 62°; and upon cooling, assumes such a consistence that it does not adhere to the fingers, and can be polished by the friction of the finger nail. Treated with alcohol, it appears to separate into two parts; one soluble, resembling cerine; the other insoluble, which appears to be myricine.

The fixed oil is in every respect analogous to other fatty substances. It is fluid, and thickens rapidly, in the same way as drying oils; its colour is greenish; its smell is that of gentian; it has no taste. It is insoluble in water, and in alcohol at 30°, but is readily dissolved by ether, and alcohol at 40°. These characteristics induce me to conclude, that the glue of gentian is a mixture of fixed oil, wax, and caoutchouc.

The glue is readily obtained by treating dry gentian with pure ether, and removing the yellow crystals and oil with alcohol at 40°.

Bitter Principle of Gentian.

The time was not at my disposal to follow out completely the research, as regards the bitter principle of gentian. As it results from the experiments which have been reported upon the action of solvents, that the alcoholic extract is that which presents the bitter matter less connected with other extractive principles, gum and sugar, it was from this extract that I endeavoured to obtain it.

By treating the alcoholic extract of gentian with cold water, there are obtained, on the one hand, flocculi, composed of gentisin, resin, and a fixed oil, which can be deprived completely, by washing, of the bitter principle with which they are united in a state of mixture. There is obtained, on the other hand, a liquid of extreme bitterness, which determinately reddens litmus. By precipitating it with the subacetate of lead, two different products are obtained. The plumbic precipitate holds in combination the substance to which the solution of the principles of gentian owes its acidity. It can be separated by sulphuretted hydrogen. I have not, as yet, sufficiently studied its properties. The liquid which has furnished the deposition of lead, retains the bitter principle. By precipi-

tating the excess of lead by sulphuretted hydrogen, and concentrating the liquid by means of a salt water bath, an extract, both bitter and sweetish, is obtained; it is very soluble in water, and allows but few flocculi to deposit. Ether separates a colourless fatty matter, possessing a strong aromatic odour, and formed of oil of a very bitter odorous substance, and of wax. I have not pushed my researches further.

The presence of the acid in the plumbic precipitate, and that of the bitter substance in the liquid already deprived of a great number of the principles of gentian, form a landmark, which hereafter will serve as the point of departure for the experiments which I propose to make, in order to isolate the bitter principle; so far, it has been determined that this principle is very different from the crystalline substance, which has been conjectured long since.

Considerations upon the Pharmaceutic Preparations of Gentian.

The preparations of gentian are few in number, if we refer solely to those in which gentian is the principal base of the medicine. At once, it is evident, that it is proper to erase completely from our formularies the preparations of gentianin proposed by M. Magendie, which were originated at the period when gentianin was considered to be the bitter principle of gentian, but which lose all their interest and value, as soon as it is proved, that this pretended principle can contain but a minute and variable quantity of the true bitter principle of the root. Besides, the little efficacy of gentianin is proved by the experience of M. Magendie himself, who has taken, he says, two grains of gentianin dissolved in alcohol, without experiencing any sensation, except that of a little heat in the stomach.

Distilled water of Gentian. This is little employed, and perhaps merits being consigned to oblivion, since, from the observations of M. Planche, it has a vinous and nauseous smell, and can, when cohobated several times, produce sickness, and even a certain degree of intoxication. I have pre-

pared this distilled water, by pounding the root in a mortar, moistening it with half its weight of water, and after twenty-four hours distilling it in an apparatus furnished by M. Soubeiran, I have derived from one part of the root four parts of limpid distilled water, having a marked odour and a pungent taste.

Watery solution. Cold water removes from gentian the bitter principle, sugar, gum, a portion of pectic acid, the acid principle gentisin, a little oily substance and resin, as well as a portion of odorous and volatile matter. Hot water, employed in infusion, has an action exactly similar; only the proportion of resin dissolved is a little more. By decoction, a considerable amount of pectic acid is removed, as well as resin and fatty matter. It can be inferred from these results, that hot or cold water is appropriate to dissolve the active parts of the gentian, and that it should be employed in the preparation of the extract and the syrup of gentian.

Alcoholic solution. We have seen that strong or weak alcohol completely exhausts the gentian root of its bitterness. For pharmaceutic usage, custom has limited the strength of alcohol to 22°, which will dissolve, it is true, a large number of the principles which are foreign to the bitter substance, which is of little importance. The tincture of gentian contains bitter matter, sugar, gum, the acid principle gentisin, and fatty, resinous, and odorous substances.

Conclusion.

The principal results of my researches, have led me to correct many ideas which chemists have entertained upon the composition of gentian.

1. Gentianin, which was considered as the bitter principle of gentian, contains, on the contrary, but a small proportion of the bitterness of the root. It is composed of gentisin, or an insipid crystalline substance, and variable proportions of fatty, odorous, and bitter matters.

2. The crystalline substance of gentian, which I call gentisin, is a mass destitute of bitterness, in which is found a marked

acid property. I consider it as the colouring matter of the root.

3. The glue of gentian is composed of wax, oil, and caoutchouc.

Journal de Pharmacie.

ART. LVI.—BARK OF STRYCHNOS NUX VOMICA, SOLD IN INDIA FOR THE ROHUN, OR SWIETENIA FEBRIFUGA.

The bark of rohun has for a long time been employed with success in intermittent fever, and it was supposed that it contained quinia. To encourage researches, the Medical Society of Calcutta offered a medal of gold to the individual who should discover the desired substance; and during the following year, Dr. Piddington announced that he had settled the question. (See vols. iv. and v. of *Trans. of Med. and Phys. Society.)* But upon his arrival in India, in December, 1833, Dr. O'Shaugnessy (Professor of Chemistry in the Medical College of Calcutta) having been invited to repeat the experiments, the discovery of Dr. Piddington was not confirmed. A specimen of the pretended quinia was sent to Dr. O'Shaugnessy; a quarter of a grain was given to a cat, and the animal died at the end of an hour and a half, in violent spasms. Numerous experiments were made with the same substance, with the same results. The quinia of Dr. Piddington was nothing else but strychnia; for Dr. Wallich determined the bark from which it was derived to be that of *Strychnos nux vomica.* The false rohun stands in the same light as the false angustura, which, some years back, having been introduced into Europe, produced so many accidents, that the Austrian government and other powers caused to be destroyed all found within their territories.

The following are the characters of the two barks:

Bark of the *Swietenia*, (true rohun,) gray externally, substance red, consistence soft, texture flexible, taste slightly bitter and austere, powder coarse and red, aqueous infusion red, colour of cinchona, not affected by nitric acid.

Bark of the *Strychnos nux vomica*, gray externally, deep brown or black internally, sometimes covered with lichens of a rust colour, friable, taste bitter, insupportable, powder gray, aqueous infusion yellow; the bark assumes a blood red colour when touched with nitric acid.*

* The bark, of which mention is here made, appears to be the false angustura itself, as it presents the same characters. It is, moreover, known, that false angustura is the bark of a *Strychnos* (according to M. Virey,) near to the *S. nux vomica*, if it is not derived from this plant. As to the substance determined by Dr. O'Shaugnessy to be strychnia, it appears to us rather to be brucia, which is more easily confounded, from its appearance, with quinia, than it is likely strychnia would be.

MINUTES OF THE COLLEGE OF PHARMACY.

Stated Meeting, held June 28, 1837.

Henry Troth, Vice President, in the chair.

From the minutes of the Board of Trustees, the College is informed, that the following gentlemen were duly elected resident members, viz: Charles Moyer, Alexander Ardley, and Llewellen Haskill.

A letter of resignation was received from William Scattergood.

The following committee was appointed to take into consideration the propriety of holding the meetings of the College quarterly, viz: William Biddle, Dillwyn Parrish, and Charles Ellis.

September 27.—Thomas R. F. Mitchell was duly elected a resident member of the College, at a meeting of the Board of Trustees.

William Biddle tendered his resignation as a member of the Board of Trustees, which was accepted, and Algernon S. Roberts elected in his place.

This being the evening of the Semi-Annual Election, the following Trustees were elected, viz:

Peter Lehman,	W. W. Moore,
Franklin R. Smith,	Jacob Bigonet,
Samuel F. Troth,	Richard Price,
Edward Needles,	Dr. F. Bache.

November 27.—Henry Troth, Vice President, in the chair.

From the minutes of the Board of Trustees, the College is informed of the election to associate membership of LANSING B. SWAN, of Rochester, New York.

The Report of the Committee in relation to an alteration of the laws of this College, so as to diminish the number of meetings during the year, being under consideration, it was resolved to amend the same by inserting Monday, instead of Tuesday.

The Report was then adopted.

The following is the amended form of Sect. 1st, Law 7th.

"The stated meetings of the College, for the transaction of business, shall be held on the last Monday of March, June, September, and December."

An Address delivered by Earl Stanhope, before the London Medical Botanical Society, was received; and on motion, it was resolved, that the same be referred to the Publishing Committee.

NOTICE.

Lest the readers of the Journal should be led into misapprehension as regards the soda fountain described by Mr. Swan, in the last number, they are informed that the inventor has applied for a patent right, securing to himself the advantages of the ingenuity he has exhibited in its construction. Of this we were not aware, when the article was published.

MISCELLANY.

Ointment for the cure of Scabies.—Dr. N. Meyer, of Minden, has made use of the following ointment, in the treatment of this disease:—

℞.	Sulphuris Depurati	℥i.
	Pulv. Radicis Helebori albi.	ʒij.
	Kali Nitrici	gr. x.
	Saponis Nigri	℥i.
	Adipis Suilli	℥iij.

M. Ut fiat unguentum.

The patient is placed in a chamber, which, in winter as well as summer, is kept at a temperature equal to 28 to 30° R.; he is put in a warm bath, in which his whole body is rubbed with black soap and coarse woollen cloths, so strongly, that all the pustules which have appeared are rubbed off. He is then put to bed between two blankets, wrapped up in a thick woollen cloak; here he remains for twelve hours; and then, for the first time, he is rubbed over the whole body, near the stove, with the ointment. After having rubbed in this ointment, the patient lays himself, similarly wrapped as before, in his bed; and after twelve hours more, a second rubbing is performed, and again, after another twelve hours, a third and last rubbing is accomplished. After this, having lain for another twelve hours, he is put into a warm bath, in which every trace of the ointment is carefully removed, by rubbing with black soap and woollen cloths.—*Dublin Journal of Medical Science*, *September*, 1837.

Suppurative Peas.—Issue peas are generally made of orange wood or orris root, but it frequently happens that they are not sufficiently active, and it is desirable to increase their activity. Under these circumstances, cantharides, or epispastic ointments are employed, which are always productive of much suffering. This inconvenience is avoided by the employment of *suppurative peas;* and as their preparation is known but to a few pharmaceutists, I have thought that it would be useful to publish a formula, which for a long period has succeeded well; it is the following:—

Take of Alcoholic extract of the bark of
Daphne Gnidium, ℥i.
Rectified Alcohol, ℥iv.
Dissolve and filter.

Take the orange wood peas from the thread and plunge them for five minutes in the solution, then remove them and allow them to dry in the air. Repeat this twice more, permitting them to dry each time; when completely dry, rub them with a linen rag to restore their shining surface. Place them in bottles, or re-string them.

If they be not detached prior to immersion, they will but imperfectly imbibe the solution; and if allowed to remain in it longer than the time specified, they will swell too much and become irregular. The peas of orris cannot undergo this operation, in consequence of their porosity, which causes them to dilate too much, and lose their spherical form, which should be preserved.

The suppurative peas are useful whenever it is wished to produce abundant suppuration without irritant action. It is sometimes the practice to alternate their use with those ordinarily employed; for example, every two, three, four, or even six hours, or upon alternate days.

Journal de Pharmacie.

Oxalhydric Acid of M. Guerin.—Professor Erdmann, of Leipsic, has made the remarkable discovery, that the particular acid obtained by the treatment of sugar, (oxalhydric acid of M. Guerin, artificial malic acid,) possesses the composition of tartaric acid; if a solution of this acid be allowed to stand a long time, it is transformed into ordinary tartaric acid. All the oxalhydrates are changed into ordinary tartrates; and crystallized oxalhydrate of ammonia, described by M. Guerin, is a pure tartrate of this base. The salts contain upon 2 at. of base 3 (C^4, H^4, O^5.)

A later examination has demonstrated that this acid is identical with the isomeric tartaric acid of M. Braconnot, which is obtained by the fusion of ordinary tartaric acid. M. Liebig had already obtained, long since, clear and well formed crystals of tartaric acid from the acid syrup which remains after the preparation of oxalic acid, by means of sugar and nitric acid, which he allowed to remain a long time by itself. All the anomalies, as to the modes in which the oxalhydrates exist, disappear with this beautiful and important discovery.—*Journal de Pharmacie.*

Iodine in the oleum jecoris ascelli, (oil of the liver of the codfish.)—Dr. Kopp, of Hanua, having for a long time suspected the presence of iodine in this oil, engaged M. Hopfer, of Orme, to determine the fact by experiment. The experiment was made in the following manner:—A pound of the oil possessing a reddish brown colour, was saponified with an excess of a solution of caustic soda. The soap obtained was carbonized, and

the residue lixiviated. Sulphuric acid was added to the solution, but not to complete saturation; after which the sulphate of soda was crystallized, and the mother waters evaporated to dryness. The residuum was placed in a flask with a small quantity of water, and concentrated sulphuric acid was added to it, with a little peroxide of manganese, when a piece of paper, covered with starch and affixed to the stopper, was coloured of a beautiful blue. Another portion of the residuum, treated with starch and nitric acid, also afforded blue iodide of starch.

M. Hansman, of Atens, in Oldenburg, obtained the same result by employing a method a little different, without a knowledge of that of M. Hopfer, of Orme.

Three drachms of clear brown oil of the liver of cod were saponified by a solution of caustic potassa; the soap was carbonized, and the carbonaceous residue lixiviated; the solution was filtered, after there had been added a small quantity of carbonate of ammonia, in order to transform the excess of caustic potassa into a carbonate of potassa; it was then evaporated to dryness. The saline residuum was repeatedly treated with hot alcohol, and the alcohol evaporated. A very small quantity of yellowish-white residuum was thus obtained, which attracted moisture from the atmosphere, and had a slight odour of iodine. This saline residuum was placed in a glass tube, very much contracted at its anterior extremity, such a one as is recommended by M. Wackenroder, for this purpose; (see his Introduction to the Analyse Chemique Qualiquative, p. 369;) then fresh starch was placed in the superior part of the tube. When concentrated sulphuric acid was poured upon it, effervescence took place; and by heating it, there were disengaged violet vapours, which coloured the starch of a deep blue. The examination of anothér sort of the oil, which was of a clearer yellow, afforded the same result, but less marked. A third sort, of a deep brown, treated in the same manner, appeared, on the contrary, to contain more iodine than the first.

These experiments not only confirm the discovery of M. Hopfer, of Orme, but moreover appear to demonstrate, that the deep coloured oil contains a little more iodine than the light coloured. Moreover, the proportion of this substance in it is always very small, and a quantitative analysis cannot be without interest.

This is the first instance of the presence of iodine in a fatty substance. M. Wackenroder thinks that it must come from the sea water, or else from the substances upon which the animal feeds. A. G. V.

Journal de Pharmacie.

Method of preserving vegetable juices and infusions; proposed by M. Fayard.—MM. Guibourt & Planche, in a report to the Societé de Pharmacie, recommend this plan to the attention of pharmaceutists; it consists "in introducing the fluids into bottles, and closing them by means of a lamina

of caoutchouc tied down upon the neck of the bottle." The plan has been practised by M. Fayard for four years, and the juices thus kept have answered the purposes of those recently prepared equally well.

Journal de Pharmacie.

Glycerine.—M. Pelouse communicated to the Societé de Pharmacie (July, 1836,) the principal results of his investigations upon this principle. He deduces the following:—1. That glycerine readily combines with sulphuric acid, and forms with it an acid, *sulpho glyceric*, analogous to sulphovinic acid, and capable also of forming salts. 2. That this sulpho-glyceric acid contains glycerine in an anhydrous state, and that it can undergo a true saponification, in such a way, that by treating it with a mineral base in excess, a sulpho-glycerate is first obtained, and then a sulphate of the same base; finally, hydrated glycerine, exactly similar to that which is disengaged from fatty bodies during saponification.

M. Pelouse concludes, from these well ascertained facts, that fatty bodies ought henceforward to be considered as true anhydrous salts, with glycerine as their base, which had been conjectured by M. Chevreul.

Journal de Chemie Medicale.

Formula for syrup of codeia, by M. Cap.—The authors of the new codex, not having given the formula for the syrup of codeia, frequently prescribed by some physicians, I have thought it would be useful to publish that which I have followed for several years, as also the method pursued by me in its preparation.

℞.	Crystallized codeia,	24 grains.
	Distilled water,	4 ounces.
	Very white broken down sugar,	8 "

Reduce the codeia to an impalpable powder in a glass or porcelain mortar. Triturate it with a third of the water; allow it to settle, and decant. Act upon the residuum with another third of the water, and then again with the remainder. Reunite the whole in a small mattrass, covering the opening with a piece of moistened parchment pierced with a pin hole. Heat in a salt water bath, until the codeia has entirely disappeared; remove the mattrass from the fire to add the sugar, cover the opening anew, agitate it, plunge it again in the bath, and allow it to remain until the sugar is completely dissolved. Filter the syrup through paper, in a cool situation, and preserve it by the ordinary means.

This method has for its aim, the avoidance of prolonged contact with heat, which would have more than one inconvenience. If the pulverized codeia were solely brought in contact with hot water, it would remain a long time before being dissolved, under the form of oily globules; while on the contrary, when reduced to a very fine powder, it is dissolved at a low

temperature. In the second place, if the sugar be dissolved while the heat is continued, the syrup would be sensibly coloured.

Each ounce of syrup contains two grains of codeia, according to the dose of M. Barbier, of Amiens. *Journal de Pharmacie.*

Means of detecting the presence of farina mixed with fecula.—Several members of the Societe de Chemie Medicale, have been consulted upon the means of detecting the mixture of farina with fecula. It is conceived that the high price of fecula may, at the present time, render this sort of fraud probable, while up to the last year, this mixture could not be supposed but inversely; that is to say, up to this time, the weight of farina was more likely to be increased by adding fecula. If the first falsification was very difficult to discover, the second could doubtless be easily indicated by many methods, and especially by the following:

Prepare a solution containing 1 part, by weight, of pure soda, to 100 parts of distilled water. Weigh out two grammes of the fecula to be tested, mix them with 100 grammes of the alkaline solution, and, at the end of two minutes, add 200 grammes of pure water; agitate in a brine prover, and allow to deposit. If the fecula be without mixture, it will occupy about 100 times the primitive volume of the supernatant water. If it be mixed with farina, the supernatant solution will be more or less clouded and the volume of matter less bulky.

It will be most satisfactory to make each time a comparative trial with pure fecula, as the temperature may alter the effect.

Perhaps this trial can be rendered applicable to mixed farinas, by studying the analagous reactions of divers proportions between fecula and farina—the presence of gluten, albumen, &c., as well as the difference of cohesion and volume of starch, and the fecula of the potato, at least permit us to hope so. *Journal de Chemie Medicale.*

Action of neutral Hydriodate of Potassa upon the Bisulphate of Quinia, and the new compound which results, by M. Righini. In the Bibliotica di Farinacia Chemica, da Antonino Cataneo, for September, 1836, appeared an extract from the experiments of Dr. Inglis upon iodine, in which he demonstrates the action of neutral hydriodate of potassa upon sulphate of quinia. The phenomena, which result from this reaction, have for some time been studied by me, but I have not published them, because I wished to correct my errors. Although Dr. Inglis has witnessed the changes produced by hydriodate of potassa upon sulphate of quinia, yet my more extended experiments have demonstrated, upon analysis, that this chemist has been guided by a false light, in considering the compound resulting from the decomposition of the two salts, as an iodide, although he does not deny, that in the reaction an iodate is formed.

The following are my experiments:

I dissolved twenty-four parts of neutral hydriodate of potassa, and twenty of bisulphate of quinia, each separately, in eight parts of distilled water. The solutions having been filtered, I added, drop by drop, that of the hydriodate into the liquid containing the sulphate. The mixture, after its penetration, acquired a pale yellow tint, which continued during some minutes, when the liquid became coloured, and a saffron yellow colour was developed; by minutely observing these changes, I perceived that at this moment decomposition took place, and a red powder was deposited, similar to that of the carbonate of peroxide of iron. The liquid from which the precipitate was separated, became limpid and devoid of bitterness. I collected the precipitate obtained, and, after having placed it upon a filter, I washed it promptly with distilled water, so as to deprive it of every particle of sulphate of potassa, which by chance might have remained with it; and I dried it in the shade, upon a cloth covered with leaves of bibulous paper.

Explanations of the phenomena which take place in the decomposition and analysis of the compound resulting.

The first direct action, is that of the sulphuric acid combined with the quinia; it acts upon the potassa, and sets the iodine free. This, uniting with a portion of quinia, gives origin to iodide of quinia and sulphate of potassa; but as the acid in the sulphate is in excess, this decomposes a portion of hydriodate still untouched, separates the hydriodic acid, which, by combining with the remaining quinia, forms a sub-hydriodate, which is precipitated, intermixed with iodide.

The theory accords with the analysis of the precipitate, the composition of which I present.

Hydriodic acid,	30
Quinia,	50
Iodine,	20
	100

Physico-chemical properties of the compound.

The taste of this substance is acrid and bitter. It is little soluble in distilled water at the ordinary temperature, but at 60° R. it dissolves completely, and after some time is decomposed, losing its colour, and developing the odour of iodine. The same decomposition takes place when the compound is dissolved in water at the ordinary temperature, but it then requires more time, and the assistance of the atmosphere. It is very soluble in alcohol at 40°, but, by its solution, loses its red colour, and takes that of a pale yellow. Diluted sulphuric acid, dropped into

the solutions, disengages more or less hydriodic acid. The same effects take place with hydratic ether. The capacity of saturation of hydriodic acid for quinia appears to me extremely weak.

Note upon the foregoing, by M. CHERAU.

The remarks made by M. Righini, are based upon the observation made by Dr. Inglis, that when neutral hydriodate of potassa is brought into contact with sulphate of quinia, reaction takes place. Without searching into the nature of this reaction, it is to be observed, that it was noticed in France, both by M. Reignier, pharmacien at Collet, Allier, and by M. Pelletier, who has published a memoir upon the action of iodine and its acids upon organic bases. (*See Journal de l'Institut*, 1835, *No.* 147.) The work of M. Reignier, which has not been printed, was addressed to M. d'Arcet in 1836, with a specimen of the product. But this work was forgotten. See what M. Reignier has written upon the subject.

Note upon Iodide of Quinia.

At the commencement of 1835, in making a solution of sulphate of quinia in a porcelain mortar, which had contained hydriodate of potassa, I perceived that an abundant yellow precipitate was formed. I was at no loss to conjecture what had caused this precipitate, and repeated the operation by taking eight grammes of hydriodate of potassa, dissolved in thirty-two grammes of distilled water, slightly acidulated, and mixing the two liquids, I obtained the same yellow precipitate, which I presumed to be the iodate of quinia; but I was, at a later period, convinced that the salts of iodine, when acted upon by acids, lose their action by giving off iodine.

This precipitate being obtained, it is important to know the most prominent characters. These are the result of my researches:

The precipitate, placed to drain upon the paper filter, rapidly passed to red, then to a reddish brown; treated by alcohol at 36°, it was entirely dissolved; submitted to evaporation and crystallization, there were formed in a few hours transparent crystals, of a beautiful yellow colour.

These crystals are quadrangular silky prisms. Exposed to the air, these crystals soon lose their transparency, and finally become reddish yellow.

The iodide of quinia appears to be not only a salt of an organic basis, increasing the number of those made known to us daily, but also a medicinal agent of considerable power in scrofulous diseases, and in the treatment of certain tumours where iodine and the bitters are administered in concert. Already several physicians have commenced to employ it. It is probable that they will derive beneficial results from it in practice.

Journal de Chemie Medicale.

Toxicological effects of Iodide of Lead.—M. Paton, in a note upon iodide of lead, states, that iodine forms combinations, of which the soluble ones are violent poisons, while those which are insoluble or little soluble, are comparatively innocent. Being desirous of knowing to what degree iodide of lead possessed toxicological properties, he prepared it himself in order to secure its purity ; he then administered twelve grains to a half grown cat; four hours afterwards, no sensible effect was produced, when he administered twelve grains more; in twelve hours after the administration of this last dose, the animal, without having vomited, appeared uneasy, constantly refused nourishment, appeared to suffer in the region of the kidneys, and avoided the sitting position; finally, it was seized with violent colic, which caused great jactitation, and apparent horrible suffering; and death supervened three days after taking the poison.

The dissection was made twelve hours after, and did not bring to view any trace of irritation; the lungs presented a pale rose-like tint; the stomach was empty, and contained a lumbricus ; a single external yellow spot was seen upon the pylorus; the intestines were nearly empty, and contained three tœnias.

To see if it were possible to determine the chemical nature of the poisoning, he examined the interior of the stomach, but could not detect an atom of the poison. He collected the excrements of the animal, and the contents of the intestines, which did not manifest the presence of the least portion of iodide. He boiled these matters in distilled water, the liquid was filtered, then decoloured with carbon, and afforded no change of colour by the action of re-agents. He next boiled the residuum on the filter in water, acidulated with nitric acid, filtered and added a few drops of the solution of chromate of potasssa ; a brown precipitate of chromate of lead was formed, mixed with animal substances. The liquid was evaporated, and the product of evaporation calcined in a crucible along with the residuum left by the water. These calcined matters, brought in contact with weak nitric acid, gave rise to an extrication of nitrous gas, and the liquid product afforded, with re-agents, all the phenomena appertaining to soluble salts of lead.

Hence, he concludes, that iodide of lead introduced into the stomach is partly absorbed, and it is this portion which produces death; that the other retained in the intestines can be detected by the afore-mentioned means.—*Journal de Chemie Medicale.*

ERRATA.—Page 307, lines 13 and 29, for "Foster," read *Forster*. Page 316, line 22, for "Eblina," read *Eblana*.

INDEX I.

AUTHORS OF ARTICLES IN THE THIRD VOLUME OF THE AMERICAN JOURNAL OF PHARMACY.

INDEX II.

SUBJECTS OF ARTICLES IN THE THIRD VOLUME OF THE AMERICAN JOURNAL OF PHARMACY.